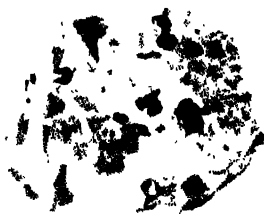
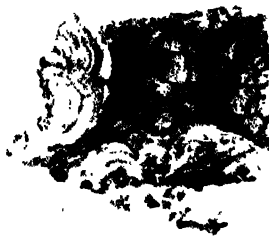


MINERALOGY



THE
NEW GRESHAM
ENCYCLOPEDIA
VOLUME VII

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VOLUME VII



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KEY TO PRONUNCIATION

The method of marking pronunciations here employed is either (1) by marking the syllable on which the accent falls, or (2) by a simple system of transliteration, to which the following is the Key:—

VOWELS

ā, as in <i>fate</i> , or in <i>bare</i> .	eu, a long sound as in Fr. <i>jeûne</i> =Ger. long <i>ö</i> , as in <i>Söhne</i> , <i>Goethe</i> (Goethe).
â, as in <i>alias</i> , Fr. <i>âme</i> , Ger. <i>Bahn</i> =â of Indian names.	eu, corresponding sound short or medium, as in Fr. <i>peu</i> =Ger. <i>ö</i> short.
ä, the same sound short or medium, as in Fr. <i>bal</i> , Ger. <i>Mann</i> .	ö,*as in <i>note</i> , <i>moan</i> .
a, as in <i>fat</i> .	o, as in <i>not</i> , <i>soft</i> —that is, short or medium.
â, as in <i>fall</i> .	o, as in <i>move</i> , <i>two</i> .
ä, obscure, as in <i>rural</i> , similar to <i>u</i> in <i>but</i> , é in <i>her</i> : common in Indian names.	û, as in <i>tube</i> .
ê, as in <i>me</i> = <i>i</i> in <i>machine</i> .	u, as in <i>tub</i> : similar to <i>e</i> and also to <i>a</i> .
e, as in <i>met</i> .	u, as in <i>bull</i> .
é, as in <i>her</i> .	ü, as in Sc. <i>abune</i> =Fr. <i>û</i> as in <i>dû</i> , Ger. <i>u</i> long as in <i>grün</i> , <i>Bühne</i> .
ī, as in <i>pine</i> , or as <i>ei</i> in Ger. <i>mein</i> .	ü, the corresponding short or medium sound, as in Fr. <i>but</i> , Ger. <i>Müller</i> .
i, as in <i>pin</i> , also used for the short sound corresponding to <i>ê</i> , as in French and Italian words.	oi, as in <i>oil</i> .
	ou, as in <i>pound</i> ; or as <i>au</i> in Ger. <i>Haus</i> .

CONSONANTS

Of the *consonants*, *b*, *d*, *f*, *h*, *j*, *k*, *l*, *m*, *n*, *ng*, *p*, *sh*, *t*, *v*, *z*, always have their common English sounds, when used to transliterate foreign words. The letter *c* is not used by itself in re-writing for pronunciation, *s* or *k* being used instead. The only consonantal symbols, therefore, that require explanation are the following:—

ch is always as in <i>rich</i> .	s, always as in <i>so</i> .
d, nearly as <i>th</i> in <i>this</i> =Sp. <i>d</i> in <i>Madrid</i> , &c.	th, as <i>th</i> in <i>thin</i> .
g is always hard, as in <i>go</i> .	th, as <i>th</i> in <i>this</i> .
h represents the guttural in Scotch <i>loch</i> , Ger. <i>nach</i> , also other similar gutturals.	w always consonantal, as in <i>we</i> .
ñ, Fr. nasal <i>n</i> as in <i>bon</i> .	x=ks, which are used instead.*
r represents both English <i>r</i> , and <i>r</i> in foreign words, which is generally much more strongly trilled.	y always consonantal, as in <i>yea</i> (Fr. <i>legne</i> would be re-written <i>lëny</i>).
	zh, as <i>s</i> in <i>pleasure</i> =Fr. <i>j</i> .

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Jew, The Wandering, a legendary personage regarding whom there are several traditions. One of the most common is that he was a cobbler in Jerusalem by name Ahasuerus, at whose house Jesus, overcome with the weight of the cross, stopped to rest, but who drove him away with curses. Jesus is said to have replied: "Truly, I go away and that quickly; but tarry thou till I come". Since then, driven by fear and remorse, the Jew has wandered, according to the command of the Lord, from place to place, and has never yet been able to find a grave. The legend has been made use of by Shelley. — Cf. S. Baring-Gould, *Curious Myths of the Middle Ages*.

• **Jewel, John**, Bishop of Salisbury, born in 1522, died 1571. He was educated at Oxford, embraced the principles of the Reformation, and contributed greatly both by his work as a college tutor and by his sermons and writings to the progress of Protestantism. On the accession of Mary he at first temporized to avoid persecution, but finally in 1554 escaped to Frankfort. On the accession of Elizabeth in 1558 he returned to England, took part in all the measures for the thorough establishment of Protestantism, and became Bishop of Salisbury in 1560. He is famous for his many controversial writings, amongst which his *Apologia Ecclesie Anglicane* (Defence of the Church of England), 1562, written in Latin, is notable.

Jewellery, Personal adornment is a characteristic of all savage races, and probably preceded clothing. Necklaces were most likely the earliest objects of personal ornamentation worn by mankind, and indeed the earliest known human skeletons, found in a cave near Mentone in 1884, being the remains of a man, a woman, and a child, all wore bits of necklaces of carved bones, vertebrae, and pierced teeth. Another early form of decoration was a head-dress of feathers of some particular kind, and this, made up in a special way, frequently denoted chieftainship.

For necklaces and armlets or head-circlets it was always easy to thread berries, small eggs, or shells; and such objects abound in all collections of primitive ornaments. All these were merely the harbingers of modern jewellery, which may be defined as consisting of beautifully wrought metalwork enriched with precious stones and enamels.

The earliest metal worked by mankind was probably gold, because that metal occurs in a visible form either as dust or in nuggets, so that it is easily found and easily worked in a simple way by hammering or piercing. Strings of small gold nuggets pierced and strung together have been found in Rhodesia. Both in Egypt and in Greece the making and use of gold wire was apparently known at a very early period, and was probably made by hammering, as draw-plates were certainly unknown.

The most ancient jewellery yet known was found by Dr. Flinders Petrie, and is supposed to be some five thousand years old. It was found in the ruins of a pyramid of Sennusert II, King of Egypt, and among the most remarkable of the objects were an exquisite pectoral and a coronet. All the workmanship is of the highest excellence as regards technical skill and design.

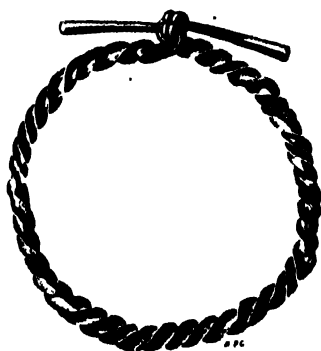
About 300 B.C. the curious 'solid' necklaces known as torcs were largely made in Europe; they were made of gold, silver, or copper, and varied much in size. In a very small size they seem to have been used as ring money. Bracelets of a similar construction, with enlarged ends, were made in Scythia. Two specimens of this work, the ends representing figures of horned monsters, are to be seen in London, one at the British Museum and the other at the Victoria and Albert Museum. In both cases the monsters show elaborate *cloisonné* work, and were no doubt originally finished with inlays of cut stones.

Very delicate gold work, *granulated work*, reached its highest development about 600 B.C.,

JEWELLERY

when the Etruscans made beautiful brooches, bracelets, ear-rings, necklaces, and diadems, ornamented with grains of gold in the most astonishingly minute way. Jewels are rarely found in this work, but small opaque enamels were sometimes used. Greek jewellers of early times were also notable goldsmiths, and their designs and methods of work have much in common with the Etruscan. Much fine Greek work has been found in the Crimea, and was preserved in the Hermitage Museum at St. Petersburg (Petrograd).

Except in India, precious stones do not appear to have been faceted until recent times, and all early jewels are either polished on their natural irregular surfaces, as is the Great Ruby



Gold Torc found in Suffolk

in the State crown of England, or else rounded and polished in the manner known as *cabochon*. The cutting of stones in facets probably began with the diamond, as it was found easier to rub two diamonds together, to produce a facet on each one, than it was to cut and polish them in a rounded form. Even irregular faceting, however, was sufficient to give effect to the peculiar refractive power of the stone, and in due time the problem of arranging the facets received careful scientific investigation, when the true brilliant form was ultimately arrived at.

In France, about the middle of the seventeenth century, Cardinal Mazarin took much interest in the question of diamond-cutting, and he had twelve fine stones cut, under his own supervision, for insertion in the crown of France. They were called the *Twelve Mazarins*, and were cut in what is now known as the *rose* form, that is to say, with a broad flat base and only faceted at the top. A true *rose* cut diamond is supposed to have twenty-four facets, but actually it depends much upon its size. A natural octahedral crystal of diamond would make two *roses*, as it would be split in two across its widest diameter. A brilliant, however, is based upon

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the complete form of a natural crystal of diamond, which resembles two pyramids joined at their bases. The design of the cutting is said to have been introduced by Vincenzo Peruzzi, a Venetian lapidary, towards the end of the seventeenth century; it should show thirty-two facets above the girdle, and twenty-four below, but in small brilliants there would naturally be fewer. A well-shaped brilliant should be almost equally deep both above and below the girdle, but most very large diamonds are altogether too flat.

'Paste' is a potash glass containing a large proportion of oxide of lead, and it refracts white light into its component colour rays almost as strongly as diamond. Its power of refraction depends largely upon the sharpness of the edges of the facets into which it is cut, and when their sharpness is worn off, the jewel loses its early brilliancy. Paste jewellery was very popular both in England and in France in the eighteenth and nineteenth centuries, and is still very extensively used. Many of the older paste jewels are charmingly set, and if in good condition, they are highly esteemed. They are usually backed with silver foil, which is apt to become discoloured. Coloured stones, rubies, emeralds, and sapphires particularly, are often faceted, but it is doubtful whether they gain anything by the process; indeed, it is often considered that they look better when cut in the rounded *cabochon* form.

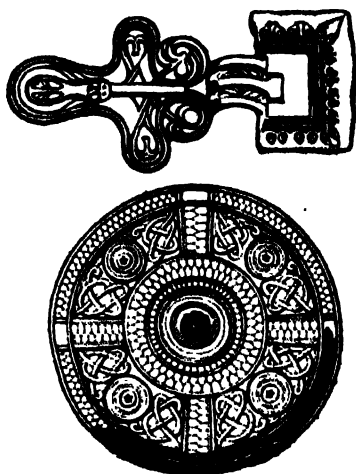
Pearls have always enjoyed a great and deserved popularity; they are composed of carbonate of lime, and do not last well. They are found in the shells of several shell-fish, chiefly in that of the pearl oyster, *Melegrina margaritifera*, found mostly near Ceylon. Pearls are caused by small objects getting into the shell. These objects may get in accidentally, or may be purposely inserted; the oyster covers them over with nacre so as to avoid discomfort. Small pieces of lead have been put into oyster shells for a very long period, and when covered with nacre, they have been cut out and used as charms.

At first garments were probably held together by thorns or by small bones of animals or fish, used as pins, but as the working of metals became gradually known, metal pins were made in quantities. The heads of metal pins developed into ornamental forms, until in early Scandinavian, Irish, and Anglo-Saxon work a beautiful series of 'pen-annular' brooches are to be found, the finest examples of which are perhaps the *Tara brooch*, the *Ardagh brooch*, or the *Hunterston brooch*, all having long pins and highly ornamental heads. But these long sharp pins must have been uncomfortable to wear, so some ingenious savage thought of bending them in half and of making loops in the blunt ends to catch over the sharp points. In this way the safety-

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pin of the present day was evolved. Some specimens of it have been found among the ruins of Troy. In Greece and Rome many curious developments of the upper part, or bow, of fibulae have been constantly found. The ornamentation of the bow of a fibula has, since that time, developed in many directions, becoming, in fact, the ordinary brooch of to-day with a quite short pin. Fine instances of this form may be found in the splendid Scottish brooches, the Brooch of Lorn or the Lochbuy brooch.

Diadems and crowns have a very long and interesting history, from a remote period when



Old English Fibulae

The upper one is of gilt bronze and was found at Fairford, Gloucestershire. The lower one was found at Abingdon, and is encrusted with garnet-coloured glass on a ground of gold foil, plate, and wire. The bosses are of ivory or bone.

chieftains of savage tribes or clans wore some form of head-dress to indicate their rank. At Mycenæ Dr. Schliemann found several thin gold diadems with simple designs punched or impressed upon them, and others of fine workmanship have been found in the Crimea. Among European crowns the finest are the beautiful Byzantine crown of Hungary, rich in enamels and cabochon jewels; the crown of Charlemagne, with splendid enamels, pearls, and cabochon stones; and the curious crown of Lombardy, enamelled and jewelled, enclosing a plain iron circlet, said to have been made from the nails that nailed Christ to the cross. The crown of Russia, of modern make, was in form like a mitre, and closely covered with fine diamonds, with one large ruby quite at the top. The State crown of England, made for Queen Victoria, is also a mass of diamonds. In front is one of the larger brilliants cut from the Cullinan diamond, and just above it is the Great Ruby, polished on

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its natural irregular surface. This stone was given to the Black Prince by Pedro the Cruel in 1367. At the back is a large pierced sapphire given to George IV by Cardinal York, and in the centre of the cross at the top is a fine sapphire, now cut in facets, which is said to have been taken from the ring of Edward the Confessor in his shrine at Westminster.

Rings are rarely found among the primitive ornaments of prehistoric races, probably because finger-rings interfere with the free use of a working hand. The important part, however, that finger-rings have played in civilized times largely compensates for their neglect among early nations. Egyptian scarabs, perhaps most usually worn on a band round the arm, were certainly often worn as rings, and set on a swivel, with the flat side next the finger; they served as seal-rings. In Anglo-Saxon times very fine rings were made of gold, run in with niello, an amalgam of silver, copper, and lead. The finest known example of this remarkable work is to be found in the ring of Ethelwulf, who reigned in the ninth century, and was the father of Alfred the Great. It is now in the British Museum.

Among the Greeks and the Romans rings of gold and other metals set with jewels or pastes were very popular, and in Rome sumptuary laws were made about the wearing of them. In the first century gold rings were only allowed to Patricians, and even they had to show a property qualification. Freedmen were allowed silver rings, but slaves might only wear iron. The inferior rings were sometimes covered with gold foil so as to look like those of Patricians, and these frauds are known as 'Samothracian' rings. They sometimes consist of only a mastic core covered with thin gold.

In the Middle Ages Papal rings were of much interest. These were often very large, and were frequently fitted with small receptacles for fragments of holy relics. They were sometimes worn on the thumb and sometimes over a glove. Decade rings, also known as penance, rosary, or diket rings, have ten small projections round the hoop and a larger boss as bezel, sometimes engraved with a cross or a crucifix. They were particularly liked by sailors.

In the sixteenth century Italian poison-rings were much in use. They had a small hollow under the bezel, in which was hidden a drop or small piece of strong poison for the owner's use in any emergency. Another form of poison-ring was aggressive, and so made that the owner could easily pierce an enemy's hand with the point of a poisoned needle. Cæsar Borgia is said to have possessed, and used, one of these murderous jewels.

Writing-rings were set with a sharp diamond point, and were at one time popular for writing

upon glass windows. With one of these rings Francis I wrote his celebrated couplet on a window at Chambord:

Souvent femme varie
Mal habill qui s'y fie.

Minute watches have often been set in rings, and not very long ago plain gold rings with mottoes engraved inside them were quite common; they were known as posy rings. Some of the posies are charming and always quite short, e.g.

The Love is true that I O U,
Let us Love like Turtle Dove.

Other rings were set with precious stones so that the initial letters of the names of the stones should spell a name or sentiment, e.g.

Ruby.	Lapis Lazuli.
Emerald.	Opal.
Garnet.	Verde Antique
Amethyst.	Emerald.
Ruby.	Muscadite.
Diamond.	Emerald.

Memorial rings form a very large class, they are generally of gold, engraved and run in with black enamel, and the bezels, which are often quite large, frequently show devices cleverly worked out in pieces of the hair of the deceased, sometimes finished with minute seed pearls. Portrait-rings with engraved stones or miniatures are still much valued; the head of Charles I is perhaps the one most commonly met with.

At the present time there is no doubt that the prevalence of machine work in jewellery has, by reason of its cheapness, largely discounted the charm of work by hand, although hand work has recently been somewhat revived on account of the beautiful work done in England by lady jewellers, of whom many are amateurs.

A new and charming rebirth of fine jewellery in every form has of late been fostered in France by René Lalique and his school. It is remarkable for learned and charming design, as well as masterly and delicate skill in technical matters. One of its outstanding merits is the large use of non-precious materials, such as horn, shell, coral, malachite, jet, and crystal.—BIBLIOGRAPHY: A. Castellain, *A Memoir on the Jewellery of the Ancients*; C. Davenport, *Cantor Lectures on Jewellery*; Jewellery; *Crown Jewels of England*; Sir J. Evans, *Posy Rings*; W. Jones, *Finger Ring Lore*; C. W. King, *Antique Gems*; H. C. Smith, *Jewellery*.

Jews, a Semitic race of people also known as Hebrews and Israelites, and whose early history is identified with that of Palestine or the Holy Land. The term Jew has three implications, viz. racial, national, and religious. Much can be said

in favour of each of these conceptions. On the one hand, it must be admitted that the majority of Jews belong to one race, whilst, on the other, it cannot be denied that many proselytes have embraced Judaism and thus become Jews. For the prophets of old, as indeed for all Semites, the unifying element was religion, common worship rather than consanguinity, or kinship of language and blood. As opposed to this view many modern Zionists are of opinion that the Jews form a nation, and that Jewish nationality is independent of religion. (See *Palestine; Zionism*.) Although the history of the Jewish people is inseparable, at least until the advent of Zionism, from the Jewish religion, we shall deal in the present article only with the history of the Jews, from its beginnings down to modern times. The creed and worship of the Jews and its developments will be treated in the article *Zionism*. We shall divide Jewish history into two periods: (1) early history, from the migration of Abraham from Mesopotamia to Canaan to the destruction of Jerusalem; and (2) modern history, or that from the Dispersion down to the fall of Jerusalem in Dec., 1917.

1. *Early Jewish History*.—The main authority for the early history of this people is the Old Testament. But the chronology is obscure and difficult to harmonize. Jewish history may be considered as beginning with the emigration of the patriarch Abraham, ancestor of the race, from Ur of the Chaldees, probably about 2000 B.C. Abraham removed to the south-east of Palestine, where we find his descendants flourishing when they were led to emigrate to Goshen, in Egypt. The interval is filled up with the history of the patriarchs Abraham, Isaac, and Jacob (q.v.). Joseph, a son of Jacob, had become Viceroy of Egypt, and his father and brothers were received with high favour by the Pharaoh who then ruled in this country. But in course of time the condition of the Israelites, under the rule of the Pharaohs, changed for the worse. They were treated as bondmen, and forced labour was exacted of them in an unreasonable degree. According to some authorities, the Pharaoh who began to oppress the Israelites was Rameses II, and their deliverance took place under his son. It was perhaps about 1320 B.C., others say 1401 B.C., that a deliverer in the person of Moses led the Israelites out of the land of bondage, where they had resided for some 400 years. By this time they formed a community of several millions, divided into twelve tribes, named respectively after Reuben, Simeon, Judah, Issachar, Zebulun, Benjamin, Dan, Naphtali, Gad, and Asher, sons of Jacob, and Manasseh and Ephraim, sons of Joseph. Under Moses' leadership they went forth into the wilderness; through him they received the law of the ten commandments on Mount

Sinal, and the whole polity by which they were to be governed as a people. A ceremonial of sacrifice was instituted, and Aaron, the elder brother of Moses, and his sons consecrated as a hereditary priesthood, the priestly functions thus falling to the tribe of Levi. The nation was established as a theocracy, and this principle, however often forgotten in times of repose, continued henceforward to be the inspiring idea of national unity throughout the frequent crises of Jewish history. The emigrants first settled at Kadesh, on the southern borders of Palestine, where they remained for many years, this being the period spoken of in the Scriptures as the forty years' wandering in the wilderness. They now marched northward to find new settlements in Palestine, which they had to wrest by force from the Canaanites. Moses died before entering the promised land, and was succeeded as leader by Joshua, under whom the Israelites advanced to the conquest of the territories of the Canaanites west of Jordan. The former inhabitants, however, were not entirely subjugated, but retained possession of a number of cities, and the twelve tribes settled in districts which were more or less cut off from one another, and which formed an exceedingly loose union of small states under tribal chiefs, at times hard pressed by neighbouring peoples. It was only long after, and by a gradual process of absorption, that the Canaanite territories and their inhabitants became amalgamated with the Israelites.

• After the death of Joshua, about 1220, or according to another chronology 1227 B.C., a succession of judges or military leaders arose. Among the more remarkable of these judges were Barak, Deborah the prophetess, Gideon, Jephthah, Samson, and Samuel. About 1070 the Philistines, who inhabited the coast and the low-lying plains west of the mountains of Judah, had defeated the Israelites and subjugated part of the country when Samuel, the last judge in Israel, was inspired to declare to Saul, a Benjamite, his destiny to become king, and anointed him as such. Saul soon proved his fitness for the post by his successful leadership of the Israelites, and he continued to organize the forces of Israel, and to fight with varying success against their enemies till his disastrous defeat and death at Mount Gilboa, after which the power of the Philistines again predominated on the west side of Jordan. On the other side of the river the military skill of Abner still preserved a kingdom for Saul's son, Ishbosheth, and gradually reasserted with some success his authority in Ephraim and Benjamin. But in Judah David, a native of Bethlehem, a warrior whom Saul's jealousy had driven into exile and alliance with the Philistines, and who had previously been anointed king in place of Saul, established a

separate principality, the capital of which was at Hebron. For seven years a fierce war was waged between the two Hebrew states, and ended only with the murder of Abner and Ishbosheth, when all the tribes acknowledged David as king. David now transferred his residence from Hebron to Jebus, a fortified city which he wrested from the Canaanites, and called the City of David, afterwards Jerusalem. He assailed and subdued the Philistines, Moabites, Edomites, Ammonites, and other surrounding nations, till all the country from the north-east end of the Red Sea to Damascus acknowledged his authority. To this prosperous kingdom succeeded his son Solomon (903 B.C., or by the long chronology 1015). His reign, owing to the warlike reputation which the nation had acquired under David, was entirely peaceful. He had no military tendencies, but he took great pains to arrange the administration of the kingdom in an orderly way, and his wisdom as a ruler and judge became proverbial. His alliances with Tyre and Egypt enabled him to carry on an extensive and lucrative commerce. He built the celebrated temple in Jerusalem, and extended and improved the city. His harem contained 700 wives that were princesses, besides 300 concubines. But with these, and with the extended commerce of the kingdom, it was inevitable that foreign elements should be introduced into the Jewish national life. Thus Solomon erected altars for the deities and the worship of the Moabites, the Ammonites, the Sidonians, and other nations; and the severe simplicity of old Hebrew manners gave place to luxury and craft.

The splendour of Solomon's reign had entailed heavy exactions upon his people. When Rehoboam, Solomon's son, succeeded, they came with Jeroboam at their head and demanded that he should make their yoke lighter. Rehoboam answered scornfully, whereupon ten tribes revolted and set up Jeroboam as king of a separate Kingdom of Israel, with its capital first at Shechem, later at Samaria. Judah, along with a part of Benjamin and the tribe of the Levites, remained loyal to the dynasty of David. After an unsuccessful attempt to reconquer the Kingdom of Israel, Rehoboam was forced by an invasion of Shishak of Egypt to give up the hope of uniting the two kingdoms. In the next generation things had changed so much that Asa, King of Judah, was obliged to seek the help of Benhadad of Syria against King Baasha of Israel. Baasha was succeeded by Elah, Elah by Zimri, and Zimri by Omri, under whom the Kingdom of Israel seems to have grown powerful. Omri established the capital of the kingdom at Samaria (about 900 B.C.), and subjugated the Moabites. The son of Omri, Ahab, married Jezebel, Princess of Tyre, an event which led

to the extension of Phœnician idolatry in Israel. As Solomon had done before, Ahab built a temple for the Syrian Baal in his capital. In his reign and subsequently the great prophets Elijah and Elisha played an important part. Ahab was slain at Ramoth-Gilead in battle against the Syrians. He was succeeded by Ahaziah (853-851), and Joram (851-843). The latter was slain by Jehu, a captain of the army, who had been anointed king by command of Elisha. Jehu (843-815) now made a clearance in Samaria of Syrian idolatries, destroying the temple of Baal and putting the priests to death. Under Jeroboam II, fourth in the line of Jehu, the kingdom reached a high point of prosperity (790-740). After Jeroboam's death there was a quick succession of kings, Zachariah, Shallum, Menahem, Pekahiah, Pekah; none of any significance. Under Pekah the Kingdom of Israel became tributary to the Assyrians. (See *Babylonia and Assyria*.) Hosea, Pekah's successor, made an ineffectual attempt to free the country from the Assyrian yoke; but finally, in 722, Samaria was captured by the Assyrian king, Sargon, the Kingdom of Israel virtually destroyed, and the chief inhabitants carried away and settled in Assyria and Media.

Generally while the Kingdom of Israel had been flourishing, that of Judah had stood in the background. Rehoboam was succeeded by Abijah, Asa, Jehoshaphat, the last a powerful and fortunate king. In the hope of putting an end to the war with the Kingdom of Israel, Jehoshaphat married his son Jehoram (848-844) to Athaliah, the daughter of Ahab of Israel. After the murder of her son Ahaziah by Jehu, Athaliah seized the supreme power in Jerusalem, and put to death her own grandchildren in order to destroy the line of David, Josiah alone being miraculously rescued. Athaliah was overthrown and put to death, and the young Josiah raised to the throne (837-797). His successors were: Amaziah (797-792), Uzziah (792-740), Jotham, Ahaz, and Hezekiah (727-699). Under Ahaz and Hezekiah Isaiah delivered his sublime prophecies. Hezekiah was one of the greatest reforming kings; his influence extended widely over the Kingdom of Israel, now in extreme decline. He was miraculously delivered from an invasion of Sennacherib, King of Assyria, by the destruction of the Assyrian army. Josiah (641-610) was the last of the pious kings of Judah. He was killed in battle against Necho, King of Egypt. After him there was an uninterrupted succession of weak and incapable monarchs, till under Zedekiah (599-588) the capture of Jerusalem by Nebuchadnezzar, 588 B.C., put an end to the monarchy, Jerusalem being destroyed and many of the people being carried captive to Babylon. The prophet

Jeremiah flourished from the reign of Josiah to the captivity.

In 539 Babylon was taken by Cyrus, King of Persia, who restored the Jews and appointed Zerubbabel Governor of Judæa, as a Persian province. The great majority of the Jews remained in Persia, however, only about 42,000 returned, and settled chiefly in the vicinity of Jerusalem. About 458 a second return of exiles was led from Persia by Ezra. Along with Nehemiah, who had been appointed Persian Governor of Judæa, Ezra promulgated the new law-book, practically identical with the *Pentateuch*. From the time of Nehemiah to the fall of the Persian Empire the Jews continued to live in peace as Persian subjects, but enjoying their own institutions. When Alexander the Great overthrew the Persian Empire, the Jews readily submitted on being promised the free exercise of their religion (332 B.C.). After the division of Alexander's empire Palestine was long a possession of the Ptolemies of Egypt, under whom it enjoyed a period of tranquillity. It was under the patronage of Ptolemy (II) Philadelphus (reigned 285-247 B.C.), according to tradition, that the *Septuagint* or Greek version of the Old Testament Scriptures was made. After the death of Ptolemy, Philopator Antiochus the Great of Syria became master of Palestine (198 B.C.). An Egyptian and a Syrian party now arose among the Jews, and gave occasion to civil dissensions, which led Antiochus IV (Epiphanes) to invade Judæa (170 B.C.), when he took Jerusalem by storm and slaughtered the inhabitants without distinction of age or sex, and endeavoured to compel the Jews to give up their religion. At length, under the leadership of the Maccabees or Asmonean family, resistance arose, and after a struggle of nearly fourteen years was successful. In 135 B.C. John Hyrcanus, son of Simon, a brother of Judas Maccabæus, completed the independence of Judæa, and extended his dominion over the ancient limits of the Holy Land. During his reign the rival sects of the Pharisees and Sadducees became established. Aristobulus I, the son of Hyrcanus, assumed the title of king, which was held by his successors. In 63 B.C. Pompey, called in to help the Pharisees, took Jerusalem, and made the Jews tributary to the Romans. Afterwards Herod the Great, who entirely threw off Jewish manners and cultivated the favour of the Romans, was recognized as King of Judæa by the Roman Senate. It was in 4 B.C., the last year of his reign, that the birth of Christ took place at Bethlehem. In A.D. 6 Judæa and Samaria became a Roman province under a procurator, who had his seat at Cæsarea, and was subordinate to the prefect of Syria. Pontius Pilate, under whom our Lord's public ministry and crucifixion occurred, was made

procurator A.D. 26. For a time the country was again ruled by a king, Herod Agrippa, A.D. 41-44. He persecuted the Christians and put the Apostle James to death. In A.D. 65 a party of the Jews revolted from the Roman yoke and roused the whole of Palestine to insurrection. Vespasian was sent by Nero to suppress it, but before the war was finished was called to the empire and left his son Titus to conclude it. The result was the capture and destruction of Jerusalem, A.D. 70, an event that deprived the Jews of the centre of unity to which their national life had hitherto clung. After an insurrection headed by Bar-Cochba, 132-135, Hadrian razed the remains of Jerusalem left by Titus to the ground, and erected in their place a Gentile city, with the title *Ælia Capitolina*. Jews were forbidden to enter this city on pain of death, and the name of Jerusalem was not revived till the time of Constantine.

2. *Medieval and Modern History.*—The remnants of the Jewish nation, scattered over all the earth, still possessed many advantages. They found proselytes and old believers in all countries of the Roman Empire, and in the East as far as the Ganges. Egypt and the northern coast of Africa were filled with Jewish colonies, and in the cities of Asia Minor, of Greece and Italy, were thousands enjoying the rights of citizens. Under the Emperor Julian they ventured to make preparations for a new temple in Jerusalem. Although this attempt failed, they derived great advantages from their *sanhedrin*, revived at Tiberias, and their patriarchates (presidencies of the *sanhedrin*), which were established. One of the works of their scholars was the collection of the traditionary expositions of the Old Testament, and additions to it, which was completed A.D. 500, and received, under the name of the *Talmud* (q.v.), as a rule of faith by the scattered communities of Jews. During the decline of civilization in Europe, the Jews made themselves masters of the commerce of the Old World, and, in spite of the dreadful persecutions which they underwent from the cruelty of the Christians, they still continued prosperous. Their practice of usury and the rapacity of the Christians, rather than religious hatred, were the true causes of these persecutions. In the cities of France, Germany, and Italy (where the Jews' quarter was known as the *Ghetto*), after the eleventh century, particular streets and enclosed places were assigned to them. In Germany they paid a considerable tax, in return for which they were protected as the money agents of the Holy Roman Empire. Their conversion to Christianity could not be effected by such treatment. In Spain and Portugal, indeed, at the end of the fifteenth century they yielded to force, and suffered themselves to be

baptized *en masse*, but as soon as the storm was over they were seen again in the synagogues. The worship of saints and relics must have appeared to them idolatry, and might well persuade them that their own pure monotheism was more rational and scriptural.

The philosophical spirit of the last half of the eighteenth century first began to acknowledge the rights of the Jews. In France, as a consequence of the Revolution, civil rights were granted to the Jews at the end of the eighteenth century, and gradually a similar treatment was accorded them in most European countries. In Russia, until 1917, they were still under special laws, and were excluded from public life. There is no distinction whatever between Jews and Christians by the Constitution of the United States, but in some of the states certain officers are required to profess under oath their belief in the Christian religion. After repeated unsuccessful attempts to procure their admission into the British Parliament, the object was at last effected by an Act passed in 1858.

Singularly enough, towards the end of the nineteenth and at the beginning of the twentieth centuries the Jews in several countries have been the victims of a revival of the persecuting spirit. This has been the case in portions of Russia, under the government of the Tsars as well as since the Revolution of 1917. France, too, witnessed outbreaks of the anti-Semitic spirit, which was largely at work in connection with the Dreyfus case, and has met with considerable support from a section of the press. In Germany anti-Semitic societies have been formed in various towns. In general the Jews, since the cessation of the severe persecutions to which they were formerly liable, have shown more disposition, while retaining their religion, to conform themselves to the manners of the peoples among whom they live. At present there is among them a movement, known as *Zionism* (q.v.), the object of which is their settlement as a body, forming an independent state or community, in Palestine. The total number of Jews throughout the world in 1922 was estimated at 14,700,000.—BIBLIOGRAPHY: H. H. Milman, *The History of the Jews*; Lady Magnus, *Outlines of Jewish History*; Th. Reinach, *Histoire des Israélites*; G. F. Abbott, *Israel in Europe*.

Jew's Ear, a Basidiomycetous Fungus, *Auricularia Auricula Judæ*, the type of the family Auriculariaceæ, distinguished by their basidia being divided by transverse walls, like those of the Russæ. It is a parasite on elder. The common and botanical names are based on a fancied resemblance of the fruit-body to the human ear.

Jews'-harp, a toy musical instrument held between the teeth, which gives a sound by the motion of a tongue of steel, which, being struck

by the hand, plays against the breath. Called also *Jews' Trump*, or simply *Trump*.

Jezreel, a city of Palestine, chosen by Ahab, King of Israel, as his chief residence. The modern Arabian name of the place is Zerin.

Jezreelites, a religious sect founded in Chatham by James White (1840-85), who assumed the high-priesthood, under the name of James Jereshom Jezreel, and gained many proselytes. When their temple and place of refuge at Gillingham, Kent, was only partially completed, the work was abandoned through lack of money. Some Jezreelites are still to be found in Chatham, and they have a firm belief in the ultimate destruction of the world by flood. The abandoned refuge-place and temples are still to be seen, and the grounds were used, before the European War, for demonstrations of a moped-rail machine.

Jháláwár, Indian native state in Rájpútána; area, 810 sq. miles; pop. 96,000. Capital, Jhalra Pátan, or Pátan; pop. 12,000.

Jhang, a town of Hindustan, in the Punjab, about 3 miles from the Chenab. Pop. (with adjoining Maghinna), 24,382. -- Jhang district has an area of 5871 sq. miles; pop. 515,000.

Jhansi (j'há'n'se), a fortified town of Central India, in Gwalior state, and an important railway centre. Within the town stands the fort on a rock. Pop. (with cantonment), 70,208.

Jhelum (j'há'lam), or **Jhllam** (j'hé'lam) (anciently *Hydaspes*), a river of India, the most westerly of the five great rivers that intersect the Punjab. It rises in Kashmir, flows south, forming the boundary between Kashmir and the Punjab, then south-west through the Punjab, and finally falls into the Chenab. Its whole course is about 450 miles, and it is navigable for the flat-bottomed boats of the country from its junction with the Chenab up nearly to its emergence from the mountains. -- There is a town of the same name on the right bank of the river, with military cantonments. Pop. 20,000.

Jibuti, or **Jibouti**, a port on the Gulf of Aden, founded 1888, at the south entrance to Tadjura Bay, with a good harbour. It is the seat of government of French Somaliland, and is the starting-point of a metro-gauge railway to Addis Abbaba, the capital of Abyssinia. Pop. about 14,000 (about 300 Europeans).

Jidda, or **Jeddah**, chief seaport of the Kingdom of Hejaz, Arabia, on the Red Sea, the port of entry for pilgrims making the *Hajj*. See *Kaaba*. Pop. 30,000.

Jig, a light quick tune or air in $\frac{3}{4}$, $\frac{3}{8}$, $\frac{2}{4}$, $\frac{1}{2}$, $\frac{3}{2}$, $\frac{4}{4}$, or $\frac{5}{4}$ time, to be found in the sonatas or suites of Corelli, Handel, and other composers till towards the middle of the eighteenth century.

The Irish jig, played to a dance also called a jig, is a lively tune of two or three sections written in $\frac{3}{4}$ time.

Jigs, appliances used in engineering workshops in the manufacture in quantity of articles of standardized sizes, to remove the necessity for measurement and marking-off on each piece. When a number of holes are to be drilled in many pieces of the same form, a jig would be made in the form of a plate with bushed holes at the places where the drills are to go through. This jig would be provided with projections, so that it can be quickly placed in exact position on the article, and with clamps or hook-bolts to hold the two together. The drilling would be done through the jig holes. If some of the holes are to be of a certain specified depth, shoulders would be made on the jig to prevent the work being carried on to a greater extent than desired. Jigs are also employed in turning, boring, milling, and other machine operations. -- Cf. Frank Lord, *First Principles of Jig and Tool Design*.

Jingoism, a term equivalent to the French word *Chauvinisme*, is applied to the warlike attitude of the advocates of imperialism and fighting patriots. The word is derived from the slang expression 'By Jingo', and came into use in 1878, when, during the Turko-Russian War, a piece of doggerel was being sung at the music halls. The lines referred to were as follows:

We don't want to fight,
Yet, by Jingo, if we do,
We've got the ships, we've got the men,
And got the money too.

Jinn, *Jinnæ* being the singular (Ar. *janna*, to be veiled, be dark), in Mahommedan mythology, a race of genii, angels, or demons, fabled to have been created several thousand years before Adam. The seventy-second Sura of the *Koran* is devoted to them. They are both male and female, eat and drink and die, although they generally live very long. They are to survive mankind, but to die before the general resurrection. Some are good and obedient to the will of God; others are disobedient and malignant. They can assume the shape of the lower animals, and are visible or invisible as they please. Their chief residence is the mountain Kâf in Arabia. The jinn, or genii, are identical with the demons and spirits in the religious literature of the Assyrians and Babylonians.

Jiu-jitsu, or **Ju-jitsu**, a Japanese system of self-defence, in which no muscular force need be exerted to any considerable extent. It was originally practised exclusively by the Samurai (warrior) class of Japan, but upon the abolition of feudalism the secret became public property, and jiu-jitsu was introduced into the physical training curriculum of all Japanese schools.

Eventually the system was adopted by both European and American police organizations.

To employ the principles successfully, average strength and physical fitness are required. There are certain 'vital' spots in the body which must be studied, and these, subjected to certain 'locks' and 'holds', place an opponent in such a position that he must either submit or risk the loss of a limb. A jiu-jitsu expert soon recognizes when an effective hold or lock has been obtained, and the vanquished wrestler generally admits his defeat by stamping on the ground. In the hands of an untrained person any jiu-jitsu hold may prove dangerous, while, on the other hand, the instruction of the novice is not always accompanied by conditions of perfect safety.—Cf. L. MacLaglen, *Jiu-jitsu*.

Joachim (yo'a-hēm), Joseph, violinist and composer, born of Jewish parents near Pressburg in 1831, died in 1907. He studied at Vienna and Leipzig, and in 1844 made a first visit to London, where he was enthusiastically received. He was concert director at Weimar from 1850 to 1853, at Hanover till 1868, and in 1869 was appointed head of the Conservatory of Music in Berlin. As a violinist he was gifted with a supreme power both of execution and interpretation, whilst his compositions are held in high estimation.

Joachimsthal (yo'a-hims-täl), a small mining town of Bohemia, Czechoslovakia, in a valley of the Erzgebirge, 70 miles w.s.w. of Prague. It depends chiefly on its valuable lead- and silver-mines. *Thaler* pieces derived their name from being first coined here. Pop. (commune), 8000.

Joan, the female Pope, according to a story long believed, but now acknowledged to be a fiction, was said to have been a native of Mainz, who, falling in love with an Englishman at Fulda, travelled with him in man's attire, studied at Athens, and visited Rome. Under the name of Johannes Anglicus, she rose by her talents from the station of a notary till she was elected to the Papal chair, under the name of John VIII (A.D. 854 to 856, between Leo IV and Benedict III). She governed well, but having become pregnant, she was delivered in a solemn procession, and died on the spot.—**BIBLIOGRAPHY:** J. Dollinger, *Papal Legends of the Middle Ages*; E. D. Rhodes, *Pope Joan*; S. Baring-Gould, *Curious Myths of the Middle Ages*.

Joan of Arc (*Jeanne d'Arc*—properly *Darc*), the Maid of Orleans, a heroine in French and English history, was born in the village of Domrémy, Basse Lorraine, now department of the Vosges, between 1410 and 1412. While she was still a girl she began to be deeply affected by the woes of her country, much of which was conquered by the English, leaving only a small

portion to the French king, Charles VII. In 1428 Orleans was being besieged by the English, and its fall would have ruined the cause of Charles. At this time Joan, who had been noted for her solitary meditations and pious enthusiasm, began, as she declared, to see visions and hear angelic voices, which ultimately called upon her to take up arms for Charles, to raise the siege of Orleans, and conduct Charles to Rheims to be crowned. At first she was regarded as insane, but eventually she found her way to the king and his councillors, and, having persuaded them of her sincerity, received permission to hasten to Dunois (q.v.), the heroic soldier known as the Bastard of Orleans, who was commander in that city. In male dress, fully armed, she bore the sword and the sacred banner, as the signal of victory, at the head of the army. The first enterprise was successful. With 10,000 men she marched from Blois, and on the 20th April, 1429, entered Orleans with supplies. By bold sallies, to which she animated the besieged, the English were forced from their entrenchments, and Suffolk abandoned the siege (8th May, 1429). Other successes followed; Charles entered Rheims in triumph; and at the anointing and coronation of the king, 17th July, Joan stood at his side. She was wounded in the attack on Paris, where Bedford repulsed the French troops, but continued to take part in the war till 23rd May, 1430, when she was taken prisoner by the Burgundians, and sold to the English. She was taken to Rouen, and after a long trial, accompanied by many shameful circumstances, condemned to death by the Church as a sorceress. On submitting to the Church, however, and declaring her revelations to be the work of Satan, her punishment was commuted to perpetual imprisonment. But pretexts were soon found to treat her as a relapsed criminal, and as such she was burned at Rouen, 30th May, 1431, and her ashes were thrown into the Seine. She died with undaunted fortitude. Five years after, a court, specially constituted by Pope Calixtus III to examine the charges against the Maid of Orleans, pronounced her innocent. Voltaire, in a notorious burlesque, Southey, Schiller, and others have made her the subject of their verse. Schiller's drama still remains the worthiest monument of her fame. The question of her canonization came up before the Roman Curia in 1875, and she was beatified by Pope Pius X on 11th April, 1909. On 16th May, 1920, she was canonized in St. Peter's at Rome.—**BIBLIOGRAPHY:** A. Lang, *The Maid of France*; M. G. Fawcett, *Five Famous French Women*; Anatole France, *Vie de Jeanne d'Arc*.

Job. In the beginning of the sixth century a.c. the prophet Ezekiel mentions Noah, Daniel, and Job as three men of pre-eminent piety

(xiv, 14, 20). Later, in the fifth century, the story of Job was written, and to this book we owe all our knowledge of the man.

(a) His country is Uz, which has been located either near the Orontes or Palmyra, or else in the vicinity of Edom (see *Lam.* iv, 21: "Rejoice and be glad, O daughter of Edom, that dwellest in the land of Uz"). In any case, he is a non-Israelite.

(b) His name evidently came down from tradition. It is in Hebrew *Iyyob*, but its meaning is never explained. It may denote the pious, or the persecuted one.

(c) His story is the important fact about him in the *Book of Job*. It is an Oriental tale about his terrible sufferings, as he lost suddenly his property and his children, in spite of the admitted piety of his life. This is the problem of the book. Why does suffering come to the good man? The writer throws his message or discussion into prose and poetry, the prologue and the epilogue being in prose, and the rest of the book being in poetry. Critical analysis has shown that the extant book contains an original sketch, with additions. The original probably included the prologue (i-ii), three cycles of dialogue between Job and three friends who attempt to console or to rebuke him (iii-xiv, xv-xxi, xxii-xxxi), God's reply to Job (xxxviii-xlii, 6), and the epilogue (xlii, 7-17), in which Job is restored to a still more prosperous condition. In this framework there has been inserted a series of speeches (xxxii-xxxvii) by a young bystander called Elihu, who is never mentioned in the prologue or epilogue. Also, the magnificent passage on Wisdom (xxviii) and some other sections are out of line with the rest of the book. The dramatic quality of the dialogues is high. Each of the three friends is characterized skilfully, and the swaying emotions of despair and hope and rebellion in Job himself are drawn with masterly care. The fine nature-poetry and the humour pale before the intense impression of a human soul wrestling with the problem of pain befalling an innocent being. For Job is represented in the prologue as a blameless man. Is suffering due to sin? Is this ancient belief adequate to the facts of life? Such are the questions the author asks himself. He states them rather than solves them. He shows that the traditional formula is unequal to life, and urges that God prefers honest perplexity to self-satisfied theories, that man is not the measure of the divine dealings, and that there is no unvarying relation between prosperity and righteousness.

Job is not an Israelite, and the problem of human suffering is not related to the Jewish law. The writer treats it on broad human lines, letting Job say daring things to God in his agony,

and pouring into the dialogues some of the most trenchant reflections upon life that occur in the pages of the Old Testament. Some have taken it as an Oriental drama. It is at any rate not meant to be a history; but a tale conveying truth, one of the greatest apologies that have come down from ancient life, the story of a sharp experience, perhaps written by some sage of Israel who desired to express his views about the meaning of the strange sufferings which had befallen Israel at and after the exile, and to suggest that affliction might be not punishment for sin, but a test of righteousness, ending in good at the hand of God. Not that Job represents Israel. But the writer takes this hero of a traditional tale in order to depict in his mysterious trials and ultimate recovery the ways of God with the nation of Israel in its present distress.—BIBLIOGRAPHY: S. R. Driver, *Introduction to the Literature of the Old Testament*; J. A. Froude, *Short Studies on Great Subjects*; M. Jastrow, *The Book of Job*; G. K. Chesterton, *The Book of Job*.

Job's Tears (*Coix lachryma*), an annual grass about a foot in height, a native of the East



Job's Tears (*Coix lachryma*)
Male flower below.

India and Japan, sometimes grown in hot-houses. The hard, round, shining grains, from whose fanciful resemblance to tears it derives its name, are used both for ornament and as food.

Jodhpur (jōd-pōr'), or Marwar, a town of

India, capital of the state of Jodhpur. It stands in a hollow enclosed by rocky eminences, on the highest of which is a fort, containing the Maharajah's palace, and commanding the city. The city has many handsome buildings, and is surrounded by a strong wall 6 miles long, with seventy gates. Pop. 59,202.—The state of Jodhpur or Marwar is the largest in Rājputāna, having an area of 84,968 sq. miles; it is well watered by the Luni and its affluents; and though arid in many parts, raises in others good crops of wheat, barley, and millet. Pop. 2,057,553.

Joel, one of the twelve minor prophets. Nothing is known of his life. He is generally supposed to have been contemporaneous with Hosea and Amos. The immediate occasion of his prophecy was a protracted drought and the ravages of an invading swarm of locusts. His book expands, however, in a style of high sublimity into predictions of future prosperity when the divine judgments should have purified the nation. Joel is quoted by St. Peter, *Acts*, ii, 16-21.

Joe Miller, the name attached to a well-known collection of jests, first published in 1739. The name belonged to a comic actor, famous as a wit and humorist. The real compiler, however, was a John Mottley, an obscure author who died in 1750.

Joffre, Joseph Jacques Césaire, Marshal of France, born at Rivesaltes 12th Jan., 1852, the son of a cooper. In 1869 he entered the École Polytechnique, Paris, and was sub-lieutenant of engineers during the siege of Paris and the campaign of 1870-1. Promoted captain in 1875, he was not further advanced for fourteen years, when he rapidly moved upwards to major (1889), lieutenant-colonel, and was decorated with the Legion of Honour (1894); professor at École de Guerre; brigadier-general of artillery (1901); Governor of Lille and general of division (1905); commander, Second Army, and Inspector of Military Schools (1909). In 1911 the notorious Caillaux recognized Joffre's great capabilities by nominating him Chief of General Staff, and as such, by a recognized rule of the French army, Joffre became Generalissimo of the land forces of France upon the outbreak of the European War in 1914. He commanded the French armies until the rearrangement of the High Command, when he retired (Dec., 1916), subsequently becoming Chief Technical Adviser to the Allied Forces, and accompanying Viviani on his mission to America in 1917. Joffre was decorated G.C.B. by King George V, 1st Dec., 1914; is a member of the French Academy, and has published *La Colonne Joffre* (*My Journey to Timbuctoo*, in English), and *Types de Casernes pour adopter en Madagascar*.—*Cl. S. Blanchon, Le Général Joffre*.

Johan'nesburg, the largest town in South Africa, in the province of Transvaal, the central point of the gold-fields of the district stretching 50 miles west to east, and known as the Witwatersrand. Dating from 1886, and created by the mining industry, it now covers a large area, the streets and squares are all well laid out, and the public and commercial buildings handsome and substantial. It has a well-endowed university-college. Pop. 260,000 (187,166 of whom are whites).

Johan'nisberg, a village of Prussia, on the Rhine, about 12 miles west by south of Mainz, among the vineyards that produce the famous Johannisberg wine.

John, one of the Apostles, often distinguished as *St. John the Evangelist*, the reputed author of the fourth Gospel, three epistles, and the *Revelation*, was the son of Zebedee and Salome, and the brother of James. Previous to his call by Jesus he was a fisherman on the Sea of Galilee, together with his father, his brother, and Simon Peter and Andrew, who were his partners. John, together with Peter and James, was admitted to a more confidential intercourse with Jesus than the other Apostles, and he is repeatedly spoken of as 'the disciple whom Jesus loved'. His Gospel was written later than any of the others—according to some critics to refute particular heresies—and contains fuller details of our Lord's conversation and discourses than the other Gospels, and is also more doctrinal in character. Of the three epistles the first has much resemblance to the Gospel; but the other two were considered doubtful even by the early Fathers. (As to the *Revelation*, see special article.) After the death of Jesus, John continued at Jerusalem, and we afterwards find him at Samaria (*Acts*, viii, 14-25). Tradition handed down by the Fathers makes him die at Ephesus, and if he wrote the *Revelation* he must have been banished to Patmos. The time of his death is unknown.—*BIBLIOGRAPHY*: V. H. Stanton, *The Gospels as Historical Documents*; W. Sanday, *The Criticism of the Fourth Gospel*; J. Moffatt, *Introduction to the Literature of the New Testament*.

John, called the Baptist, the forerunner of Christ, was born six months before Jesus (their mothers were cousins), of a Levitical family in Judæa. He lived an austere life, given up to solitary meditations, till A.D. 20, when he began to preach in the deserts of Judæa, announcing that the kingdom of heaven was at hand, and proclaiming himself the harbinger of the Messiah. He baptized many converts, and testified to the higher mission of Jesus at the time of His baptism in the Jordan. To gratify a vindictive woman Herod Antipas, tetrarch of Galilee, caused him to be beheaded in prison. But for long afterwards his disciples continued to form a separate

body, and are said to have established the still existing sect of Sabians or St. John Christians in Persia, distinguished for their veneration of John the Baptist.—*Cf.* H. R. Reynolds, *John the Baptist*.

John, the name of twenty-three Popes, among whom are the following:—**John I** (*St. John*), Pope A.D. 523-526. Theodoric sent him to Constantinople, to induce the Emperor Justin to adopt milder measures towards the Arians, and on his returning without success Theodoric threw him into prison, where he died.—**John XII** succeeded Pope Agapetus II in 956, when only eighteen years old. He was the first Pope who changed his name on his accession to the Papal dignity. His life was so licentious and disorderly that the Emperor Otho had him deposed by a council in 963, and Leo VIII elected in his stead. But on Otho's departure John returned to the city with a strong body of followers and drove out Leo. He died in 964.—**John XXII**, a native of Cahors, was elected Pope at Lyons in 1316, after the death of Clement V. He resided at Avignon, and took an active part in the disputes of the Emperors Louis of Bavaria and Frederick of Austria. He died in 1334. **John XXIII** (*Balthazar Cossa*), born in Naples, was a pirate in his youth, afterwards studied at Bologna, and was elected Pope in 1410, by the Council of Pisa, after the death of Alexander V, on condition that, if Gregory XII and Benedict XIII would resign, he would also retire to end the schism. He summoned the Council of Constance, demanded by the Emperor Sigismund, in 1415, and was deposed by this council as guilty of a long list of heinous crimes. For some years he remained in custody, but was ultimately pardoned by Pope Martin V, and made a cardinal. He died in 1419.—*Bibliography*: Mandell Creighton, *History of the Papacy*; L. Pastor, *History of the Popes*.

John, King of England, born in 1167, died in 1216. He was the youngest son of Henry II, by Eleanor of Guienne. Being left without any particular provision, he got the name of *Sans Terre* or *Lackland*; but his brother, Richard I, on his accession conferred large possessions on him. He obtained the crown on the death of Richard in 1199, although the French provinces of Anjou, Touraine, and Maine declared for his nephew, Arthur of Brittany, who was lineally the rightful heir, then with the King of France. A war ensued, in which John recovered the revolted provinces and received homage from Arthur. In 1201 some disturbances again broke out in France, and the young Arthur, who had joined the malcontents, was captured and confined in the castle of Falaise, and afterwards in that of Rouen, and never heard of more. John was universally suspected of his nephew's death,

and the states of Brittany summoned him before his liege lord Philip to answer the charge of murder, and in the war which followed John lost Normandy, Anjou, Maine, and Touraine. In 1205 his great quarrel with the Pope began regarding the election to the see of Canterbury, to which the Pope had nominated Stephen Langton. The result was that Innocent III laid the whole kingdom under an interdict, and in 1211 issued a Bull deposing John. Philip of France was commissioned to execute the decree, and was already preparing an expedition when John made abject submission to the Pope, even agreeing to hold his kingdom as a vassal of the Pope (1213). John's arbitrary proceedings led to a rising of his nobles, and he was compelled to sign the Magna Charta or Great Charter, 15th June, 1215. But John did not mean to keep the agreement, and obtaining a Bull from the Pope annulling the charter, he raised an army of mercenaries and commenced war. The barons, in despair, offered the crown of England to the dauphin Louis, who accordingly landed at Sandwich 30th May, 1216, and was received as lawful sovereign. The issue was still doubtful when John was taken ill and died at Newark, in the forty-ninth year of his age.—*Cf.* Kate Norgate, *England under the Angevin Kings*.

John II, King of France (1319-64), surnamed the *Good*, was a monarch distinguished alike for his incapacity and his misfortunes. In 1356 he was defeated and taken prisoner by the Black Prince at the battle of Poitiers, and was detained at Bordeaux and at London till released at a heavy expense to his country by the Peace of Brétigny in 1360; but on learning that his son, the Duke of Anjou, who had been left as a hostage in England, had effected his escape, he returned to London, where he died in 1364.

John III (*Sobieski*), King of Poland, son of Mark Sobieski, a Polish captain, was born at Olesko, in Galicia, 8th June, 1624, died 17th June, 1696. He served in the French army, returned to Poland to repel the Russians in 1648, and greatly distinguished himself in several campaigns against Cossacks, Tatars, and Turks, especially by his defeat of the last in the great battle of Khotin in 1673. The year after, on the death of Michael Corybut, he was chosen king. His most celebrated achievement was the relief of Vienna, besieged by a great army of Turks, whom he decisively defeated 12th Sept., 1683. His last years were disturbed by the intrigues of his own family and the anarchy of the country, which he was unable to control, and in which he foresaw its approaching downfall.

John Bull, a name first used by Dr. Arbuthnot, in 1712, and since popularized as a typical name suggesting a humorous or burlesque representation of the English character. He

is represented as a bluff, jolly, bull-headed farmer.

John of Austria, commonly called *Don John of Austria*, the natural son of the Emperor Charles V and Barbara Blomberg, was born at Ratisbon in 1545, and died in 1578. In 1570 he conducted a campaign against the recalcitrant Moors of Granada with great vigour and relentlessness, and in the following year he commanded the allied fleet which won the great naval battle of Lepanto over the Turks (7th Oct. 1571). In 1576 he was appointed Governor of the Netherlands, and had just won along with the Prince of Parma the victory of Gembloux (1578) over William the Silent, when he died, not without suspicion of having been poisoned by his jealous half-brother, Philip II.—Cf. L. Coloma, *Story of Don John of Austria*.

John of Gaunt, a corruption of *Ghent*, where he was born in 1340, died 1399, was the fourth son of Edward III and his queen Philippa, daughter of the Earl of Hainaut. He was created Duke of Lancaster in 1362; served in the French wars, and became Governor of Guienne. He assumed in right of his wife the title of King of Castile, invaded the kingdom to assert his claims, but subsequently relinquished them in favour of Prince Henry of Castile, who had become his son-in-law. His eldest son Bolingbroke became King of England as Henry IV.

John o' Groat's House (popularly *Johnny Groat's House*), a house formerly situated about 2 miles west of Duncansby Head, and forming about the most northern extremity of the mainland of Great Britain. According to legend, it was built in octagonal form, with eight doors, and contained eight tables, to prevent disputes on precedence in the Groat family.

John's, Eve of Saint, a popular celebration of remote antiquity, held on the vigil or eve of the feast of the nativity of John the Baptist, 24th June (Midsummer Day). On the eve of the feast it was the custom in former times to kindle fires (called St. John's fires) upon hills in celebration of the summer solstice, and various superstitions were long practised on this occasion. The custom still lingers in some parts of Europe.

Johns Hopkins University, one of the foremost universities of the United States, in Baltimore, Maryland, endowed by Johns Hopkins, a merchant of Baltimore, with more than 3,000,000 dollars, founded in 1867, and opened in 1876. Besides the library there are well-equipped laboratories for chemistry, biology, &c. There is an extensive teaching staff (350 instructors in 1919), and instruction is given to two grades of students, graduates and undergraduates. The former are such as have taken a degree here (that of B.A.) or elsewhere, and

wish to carry their studies farther, this university giving special attention to advanced studies of various kinds, as well as to original research. A number of periodicals are issued in connection with the university. There are, besides numerous scholarships, about twenty fellowships, each of the value of 500 dollars annually. A hospital, also endowed by Johns Hopkins, is connected with this institution.

Johnson, Andrew, seventeenth President of the United States, born in North Carolina 1808, died 1875. He was self-educated; entered Congress as a Democrat in 1843, and the Senate in 1857. On Lincoln's election he became Vice-President, and thus became President upon the assassination of Lincoln in April, 1865. During his term of office he was in constant conflict with the Senate, and was impeached by the House of Representatives of high crimes and misdemeanours (Feb., 1868), the trial ending in a technical acquittal. A general amnesty to the rebels was his last presidential act.—Cf. J. S. Jones, *Life of Andrew Johnson*.

Johnson, Samuel, English lexicographer and literary dictator, was born on the 18th Sept., 1709, and died on the 13th Dec., 1784. His father was Michael Johnson, a bookseller of Lichfield. Johnson largely educated himself in his father's shop, though he attended schools at Lichfield and at Stourbridge. In 1728 he went up to Pembroke College, Oxford; the exact duration of his stay there is uncertain, but he did not graduate, though he acquired a reputation for learning, and translated Pope's *Messiah* into Latin verse. Johnson's father died on the verge of bankruptcy in 1731, and Johnson had some difficulty in securing employment. He became an usher at Market Bosworth Grammar School in 1732, but hated his work, and went to Birmingham, where he assisted the publisher of the *Birmingham Journal*, and translated Lobo's *Voyage to Abyssinia* from the French—his first book. In 1735 he married a widow, Mrs. Porter, who was more than twenty years his senior. He described the match himself as "a love-marriage on both sides". He then attempted to start a school at Ednal, near Lichfield, but his grotesque appearance terrified his pupils so much that the project was a failure. David Garrick was one of his few pupils; in March 1737 he and Garrick set out for London together with hardly any money. Johnson began by contributing to the *Gentleman's Magazine*, and edited reports of the debates in Parliament, which to avoid legal penalties were entitled *Reports of the Debates of the Senate of Lilliput*, and provided with fictitious names. After a while he wrote these reports himself, continuing to do so from July, 1741, to March, 1744. He based his reports upon very inadequate notes, and always took

care that "the Whig dogs should not have the best of it". In 1738 Johnson published his poem *London*, which is a free imitation of the third satire of Juvenal. He gained a certain amount of fame and ten guineas in cash. In 1744 he published his *Life of Richard Savage*, whom he had known intimately, and who was an earl's son and an outcast from society. In 1747 he issued the plan of his famous *Dictionary*, and began work upon it in the same year. He used an interleaved copy of Bailey's *Dictionary* (1721), and employed six amanuenses, five of whom were Scots. While at work on the *Dictionary* Johnson wrote his second Juvenalian poem, *The Vanity of Human Wishes*, an adaptation of the tenth satire. He received fifteen guineas for it. In the same year (1749) Garrick procured the production of Johnson's tragedy *Irene*. It ran for nine nights, and brought its author in almost £300, but it was a failure. Johnson did not visualize his characters, and the play consists of a series of moral dialogues, without any adequate action. In 1750 Johnson commenced to publish *The Rambler*, a paper which was modelled upon *The Spectator*. It appeared twice weekly, on Tuesdays and Saturdays, from March, 1750, to March, 1752. Johnson wrote it all himself, with the exception of five numbers, one of which was written by Samuel Richardson, and the other four by lady devotees of Johnson. *The Rambler*, although it contains plenty of sound sense, is little read nowadays; it is over-weighted with moralizing, and its occasional attempts at humour are ponderous in the extreme. In 1752 Johnson suffered a heavy blow in the death of his wife. He completed and published his *Dictionary* in 1755, and on 7th Feb. of that year wrote his famous letter to the Earl of Chesterfield in which he rejected the earl's belated offer of patronage. Before the publication of the *Dictionary* some of his friends helped him to secure the M.A. degree of Oxford, in order that it might appear on the title-page. In April, 1758, the first number of his *Idler* appeared; it was published every Saturday in Newbery's *Universal Chronicle*, and continued for two years. The papers in *The Idler* are shorter than those in *The Rambler*, and are somewhat less heavy-handed. The characters have English instead of Latin names, and the criticism offered is more mature. In 1759 Johnson's mother died, and to pay the expenses of her funeral he wrote *Rasselas* (originally known as *The Prince of Abyssinia*) in less than a week, and received £100 for it. *Rasselas* is a moral essay rather than a novel; it is somewhat heavy, but it still remains one of the best books of the eighteenth century. It was the most popular of his works, and was translated into nine languages. In 1762 Johnson received a pension of £300 from Lord Bute, and

so was able to spend his time as he liked, that is to say, he was able to talk much and write little. On the 16th May, 1763, Boswell was introduced to Johnson; in the same year The Club (afterwards known as The Literary Club) was founded. In 1765 Johnson produced his long-promised edition of Shakespeare, in eight volumes. It is customary to follow Macaulay in calling this a slovenly and worthless edition. As a matter of fact, Johnson had one quality which is unfortunately rare among Shakespearean scholars—he had plenty of common sense; and his shrewd sagacity and knowledge of the world kept him right where other scholars 'writing under the shelter of academic bowers' have gone astray. In 1770 Johnson began to write what was his masterpiece—*The Lives of the Poets*. It is true that, as Mrs. Browning said, he left the poets out; many of those men whose biographies he chose to write are unknown to-day even to professional scholars, and his treatment of the few really great men that he included—notably of Milton—is not satisfactory. With all its faults, however, *The Lives of the Poets* remains one of the best books of criticism in English. It is transparently honest, and is full of common sense and its author's immense knowledge of life. Moreover, frequent indulgence in conversation tended to make Johnson's style less heavy and slightly more colloquial. In 1775 Johnson received the degree of D.C.L. from the University of Oxford; he had received the LL.D. degree from Trinity College, Dublin, in 1765. He seldom used the title of Doctor himself.

In 1773 Johnson had accompanied Boswell to Scotland, and had published *A Journey to the Western Isles of Scotland* in 1775. He accompanied his friends the Thrales to Wales in 1774, and to Paris in 1775. He had a kind of second home at the Thrales' house at Streatham, but after Thrale's death and Mrs. Thrale's marriage to an Italian musician named Piozzi, Johnson quarrelled with his benefactress, and was deprived of his old asylum. His health began to decline; he suffered from asthma and gout, and his drowsy became worse. He died on 18th Dec., 1784, and was buried in Westminster Abbey a week later.

Johnson is perhaps the best-known figure in English literature, and yet his books are seldom read. *Irene* is forgotten; *Rasselas* is considered ponderous; even *The Lives of the Poets* is not appreciated to the full. The great *Dictionary*, a pioneer work in its day, but etymologically valueless, has been superseded. Johnson is a unique example of a man who has been dissociated from his books. He is remembered chiefly as a conversationalist, and owes no small part of his fame to Boswell, the prince of biographers.

Boswell had a strange mixture of qualities, good, bad, and indifferent, but they all combined to make him write an ideal biography.

Johnson was a most formidable man to encounter, but he was loved and respected as few other men have been. Underneath his gruff exterior he had a heart as tender as that of any woman. He combined the manners of a street-porter with the morals of a Puritan. He was kind to animals, loved children, and gave liberally to the poor. He gathered round him in his home a curious collection of pensioners, and was long-suffering to a fault with them and their jealous bickerings. Many of Johnson's peculiarities are to be attributed to the state of his health. He was always scrofulous, and inherited a melancholic disposition from his father. He had a morbid fear of death. He suffered from a kind of St. Vitus's dance, and had the habit of 'touching' so well described by Borrow in *Lavengro*. His melancholy made him too exacting with himself, and he was continually reproaching himself with laziness. This charge has been repeated by many of those who have written about him. As a matter of fact, he left a considerable amount of work behind him, though it was his character rather than his work that made him famous. He is an embodiment of his age, for better and for worse. He was a more absolute literary dictator than any who went before him or came after him. Above all he was the first literary man who fearlessly maintained his complete independence; he was one of the noblest of moralists; and the kindest of benefactors. — BIBLIOGRAPHY: James Boswell's *Life* (Dr. Birkbeck Hill's edition); G. B. Hill, *Dr. Johnson: his Friends and his Critics*; Sir L. Stephen, *Dr. Johnson* (English Men of Letters Series); T. Seccombe, *The Age of Johnson*; J. C. Bailey, *Dr. Johnson and his Circle*.

Johnston, Alexander Keith, geographer, was born near Edinburgh 1804, died 1871. His more important works were the *National Atlas*, first published in 1843; and his *Atlas of Physical Geography*, published in 1848, which gained him election to the leading geographical societies of Europe and America.

Johnston, Alexander Keith, son of the preceding, a distinguished geographer and traveller, born 1846, died of dysentery at Behobeho, East Africa, while leading an expedition sent out by the Royal Geographical Society, in 1879.

Johnston, Arthur, Scottish poet and scholar, born near Aberdeen, Scotland, 1587, died 1641. He studied medicine, graduating M.D. at Padua in 1610. He lived for twenty years in France, after which he came to England and became physician-in-ordinary to Charles I. His Latin poems consist of epigrams, &c., and a version of the *Psalms*.

Johnston, Sir Harry Hamilton, African traveller and administrator, was born at Kennington 12th June, 1858, educated at Stockwell Grammar School and King's College, London, and was for four years a student at the Royal Academy of Arts. From 1879 to 1880 he travelled in Tunis and Algeria, and in 1882 went through Portuguese West Africa and explored part of the course of the Congo. In 1885 he was British Vice-Consul in the Cameroons district, and in 1887 acting Consul in the Niger Coast Protectorate. In 1889 he was sent to the Lake Nyassa and Tanganyika region to make peace between the African Lakes Company and the Arabs, and his exertions resulted in the foundation of the British Central Africa Protectorate, of which he was appointed Commissioner and Consul-General in 1891. After acting as Consul-General in Tunis, he served from 1890 to 1901 as special Commissioner, commander-in-chief, and Consul-General for Uganda and adjoining territories. He was created C.N. in 1890, K.C.N. in 1896, and G.C.M.G. in 1901. He published various works, among them being *Essays on the Tunisian Question* (1880-1); *Life of Livingstone*; *History of the Colonization of Africa*; *The Uganda Protectorate* (1902, 2 vols.); *British Mammals*; *The Nile Quest*; and *Liberia the Negro Republic in West Africa* (1900). His novels include *The Gay Dombey* (a sequel to Dickens's *Dombey and Son*), and *Mrs. Warren's Daughter* (a sequel to Bernard Shaw's play *Mrs. Warren's Profession*).

Johnstone, a town of Renfrewshire, Scotland, on the Black Cart. It is the centre of various industries, having cotton and linen thread mills, engineering-works, and tool-works. Pop. (1921), 3,473.

Johnstown, a city of Cambria county, Pennsylvania, United States, on Conemaugh River. Founded in 1791, it became a city in 1889. It is the centre of a manufacturing district, and the town and neighbourhood belongs mainly to the Cambria Iron Company. In 1889 Johnstown and district was inundated by the bursting of Conemaugh Lake and Reservoir, situated about 10 miles above the town. Buildings (of wood) were driven by the flood into a mass of ruin, which was finally piled up against the railway bridge, and its destruction completed by fire. A relief fund of £200,000 was raised, and the city was speedily rebuilt. Pop. (1920), 67,327.

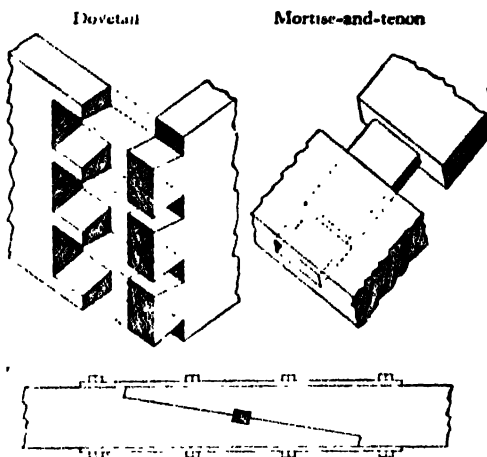
Johore, a native state under British protection at the Singapore end of the Malay Peninsula; area about 7500 sq. miles; pop. 180,500.

Joint, in anatomy, is the term applied to the arrangement of structures found where bones or cartilages come into contact with one another. The most typical joints are found where the

extremities of two bones, as, for example, is seen at the knuckles of the fingers, come into contact and a capsule of fibrous tissue passes from one bone to the other to form a closed space, the joint cavity. In such a joint the surfaces of the bones that come into contact are coated with cartilage, which is lubricated with an oily fluid (synovin) secreted by the synovial membrane, which lines the capsule but does not extend on to the cartilage. The capsule is often thickened in some places to form ligaments. The amount and direction of the movements permitted at the different joints is subject to a wide range of variation. Some, like the joints of the fingers, enable movements to occur that are practically restricted to one plane—hence they are called hinge joints. Others, like the shoulder- and hip-joints, allow a variety of movements in almost any direction; they are called ball-and-socket joints. Others again, like the joints at the wrist, permit sliding movements. There are other kinds of joints that have no cavity, the bones being more or less firmly united one to the other by a solid mass of fibro-cartilage. At such joints little or no movement at all may be permitted.

Joint, in engineering, the junction of two or more parts of a structure or machine. The term is used with many different senses. A steam-pipe system is built up of short lengths of piping with the flanges bolted together, with a *joint* between them usually made of preparations of oiled paper. To save these joints from destruction when the pipe gets hot and expansion takes place, *expansion joints* or *bends* are necessary. These permit the expansion to take place freely without stressing the material that keeps the joint steam-tight. The *universal* or *Hooke's joint* is a coupling connecting two shafts which are to a small extent out of line with each other. *Ball-and-socket joints*, *hinges*, and other *pin joints*, such as that of a crank and connecting rod, have freedom of movement in particular directions. Solid joints such as the riveted ones in boilers and those produced by the many systems of welding have none of this freedom. In steel-roof structures, the rafters, ties, bracings, and other scantlings are held together with simple rivet joints. Railway lines are provided with freedom to expand at the joints. The *fish-plate joint* allows this because the bolt holes in the rails are elongated. In tramways the rails are usually welded together, the expansive actions being prevented. In woodworking joints are made by shaping the pieces of wood so that they fit into one another. A *mortise-and-tenon joint* is one in which the tenon, or part left after the sides are cut away, of the one piece fits into a hole or mortise in the other. In *scarf joints* the ends are chamfered or notched to fit to each

other and held together by screws or bolts and nuts and side-plates. *Dovetail joints* are used extensively in furniture making. A number of



Two Forms of Scarf Joints

projections of a fan-shape are cut on the one piece and fitted to openings of a complementary shape in the other.

Joint Adventure, a partnership entered into for the attainment of one specific purpose, and ceasing when the object for which it was formed has been gained. Thus a partnership formed to acquire and sell a gold-mine is a joint adventure, but one formed to carry on the business of working the mine is not. The ordinary rules of partnership apply.

Joints, in geology, are the planes or surfaces of separation in a consolidated rock, other than those caused by parting along the surfaces of stratified layers. In igneous rocks they are caused mostly by shrinkage, as the once molten mass finally cools and settles down, and they often arise after the development of a crystalline structure. The columnar jointing that is seen in its highest development in basaltic lavas affords a fine example. There is often a tendency within each column towards the formation of spheroids by further contraction, and the column breaks across along curved secondary joints. Sometimes such spheroids are completely formed during the cooling of a lava, and the rock breaks up on weathering into globular bodies, the coats of which peel off like those of an onion. The *perlitic structure* of many glassy rhyolites shows the same tendency on a microscopic scale.

In granites the curved joint-surfaces frequently

give a form to whole hill-sides, and thus provide features in the landscape. Exfoliation in arid countries with a high temperature takes place parallel with the joints, and gives rise to fantastic forms and huge residual blocks like boulders. In other places the tabular jointing of granite simulates stratification. Such jointing is usually parallel to some original surface of cooling.

In sedimentary rocks, joints are mostly due to torsion during earth-movements. Two series usually arise, roughly at right angles to one another and to the bedding of the strata, and these give great assistance to the quarryman. Limestones and sandstones are often traversed by joints that run continuously through successive beds, and the upturned edges of these beds, or their outcrops on a valley-side, weather away in formidable scarps. Quartzite, owing to its resistance, generates an abundance of small joints, and often breaks down in angular fragments irrespective of the bedding. The fact that jointing in sedimentary masses cannot be ascribed to mere contraction is seen where the joints shear through hard pebbles in conglomerates.

Joint Stock Companies, a term applied to 'an association of individuals for purposes of profit, possessing a common capital contributed by the members composing it, such capital being commonly divided into shares, of which each possesses one or more, and which are transferable by the owner'. See *Chartered Companies*; *Limited Liability Companies*.

Joint-tenants are those that hold lands or tenements, or other property, as goods and chattels, by one title, without partition. In a joint-tenancy the last survivor takes the whole, as if the estate had been given to him only, unless any of his companions have conveyed away their shares by deed.

Jointure, a term of English law originally applied to estate settled by a husband on himself and his wife jointly, but now including estate settled on the wife alone as a provision for her in the event of the husband's predecease. A jointure must (1) take effect at the husband's death; (2) be for the wife's life, at least; (3) be made to her and not held in trust; (4) be expressed to be in satisfaction of her whole dower; and (5) be made before marriage; if made after marriage the wife may choose between it and her dower.

Joinville (zhwan-vël), Jean, Sieur de, French historian, born in Champagne c. 1224, died c. 1319. He entered the service of Thibaut, King of Navarre, and in 1248 raised a troop of nine knights and 700 men-at-arms to accompany Louis IX in his first crusade to the Holy Land. He rose high in favour with Louis, shared his

captivity, returned with him to France in 1254, and spent much of his time at court. His *Histoire de St. Louis*, one of the most valuable literary productions of the Middle Ages, has been frequently reprinted.

Joints (O.Fr. *giste*, bed), in carpentry, are the beams of timber to which the flooring of rooms and the laths of a ceiling are nailed, and which rest on the walls or girders, and sometimes on both. They are laid horizontally, and in parallel equidistant rows.

Jokai (yô'kâ-i), Mor (Maurice), Hungarian novelist, born in 1825, died in 1904. His first novel, *Working Days*, was published in 1846, and he produced altogether over 200 volumes of novels and tales, dramatic and other poems, and humorous essays. Among his numerous dramas are: *The Jew Boy*, *King Solomon*, *Manlius*, *Sinister*, *The Martyrs of Szigetwar*, and *Milton*. His *History of Hungary* appeared in 1884.

Joilet, capital of Well county, Illinois. It has an important state prison, large limestone quarries, and steel- and iron-works, &c. Founded in 1831, it became a city in 1852. Pop. (1920), 38,372.

Jomelli (yo-mel'lë), Niccolò, Italian musical composer, born 1714, died 1774. Amongst his chief works are: *L'Errore Amoroso*, a comic opera; *Armida*; *Ugenda*; *Cato Mario*; and other operas. While chapel-master at St. Peter's he composed his *Benedictus Dominus*, a masterpiece of music. His *Requiem* and *Miserere* are particularly celebrated.

Jomini (zho-mi-në), Henri, Baron, a distinguished soldier and military historian, born at Payerne, canton of Vaud, Switzerland, 6th March, 1779, died 24th March, 1869. He first served with the troops of his own country, but in 1804 joined the French army with the rank of major, accompanied Marshal Ney to Germany in 1805-7, and to Spain in 1808, in the capacity first of aide-de-camp, then of chief staff-officer. In 1808 he became a brigadier-general. He distinguished himself during the Russian campaign (1812), but subsequently entered the Russian service. He retired to Brussels, and subsequently to Passy, where he died. Some of his most important works are: *Traité des grandes opérations militaires ou histoire critique des guerres de Frédéric le Grand*, *Principes de la Stratégie*, *Vie politique et militaire de Napoléon*, and *Précis de l'Art de Guerre*.

Jonah (Hebrew, signifying dove), one of the minor prophets, son of Amittai, and, according to 2 Kings, xiv, 25, a contemporary of Jeroboam II, was born at Gath-Hepher, in Galilee. The book which bears his name is historical rather than prophetic, and the miraculous event of Jonah remaining three days and three nights in the belly of the fish has been regarded by

some as an allegory. Orthodox theologians, however, are generally of opinion that the mention of it by Christ (*Mat. xii, 39*) obliges us to regard the event as really historical. Jonah's grave is shown at Mosul, the ancient Nineveh, and also at Gath.

Jones, Henry Arthur, English dramatist, was born in 1851. After engaging in business, he produced his first play in 1878, though it was not till 1882 that he attracted attention with the melodrama *The Silver King*. Since then he occupied a leading place among contemporary English dramatists. Among his plays may be mentioned: *Saints and Sinners*, *The Middleman*, *The Dancing Girl*, *The Bauble Shop*, *The Masqueraders*, *The Case of Rebellious Susan*, *Michael and his Lost Angel*, *The Physician*, *The Liars*, *Mrs. Dane's Defence*, *The Whitewashing of Julia*, *Joseph Entangled*, *The Hypocrites*, *The Ogre*, and *The Pacifists*. Among his works on the theatre and the drama are: *The Renaissance of the English Drama*, and *Foundations of a National Drama*.

Jones, Inigo, British architect, was born in London on the 15th July, 1573, died 21st June, 1632. His father was a Roman Catholic cloth worker, and Jones remained a Catholic throughout his life. While a young man he travelled on the Continent, his expenses being defrayed by William Herbert, third Earl of Pembroke. He studied architecture and followed in the main the style of Palladio. He was summoned from Venice to Denmark by King Christian IV, and is believed to have designed two great royal palaces in Denmark, at Rosenborg and Fredericksborg. He returned to England, and was employed in designing shifting scenery, machinery, and dresses for the court masques, many of which were written by Ben Jonson. He was appointed Surveyor of Works to Henry, Prince of Wales, in 1610; after Henry's death, in 1612, he again visited Italy, and in 1615 he was made Surveyor-General of Works. He designed many well-known buildings, such as Lincoln's Inn Chapel (1617-23) and the banqueting-house at Whitehall, which was begun in 1619 and completed in March, 1622, at a cost of over £15,000. Jones was a man of an imperious and domineering disposition, and had many quarrels with Jonson, who was equally obstinate and self-assertive. The two collaborators never can have worked smoothly together at their masques; there was a good deal of enmity by 1617; and the final breach came in 1631 in connection with *Choridia*, the last masque Jonson was permitted to write. Jonson attacked Jones in his poem *An Expostulation with Inigo Jones*; brought him on to the stage as In-and-in Medley in *A Tale of a Tub* (1633), and satirized him in his entertainment *Love's Welcome at Bolsover* (1634). Jones took a prominent part

in the restoration of Old St. Paul's (1633). He had to pay heavy fines to the Parliamentary party during the Civil War, and died in comparative poverty.—*Cf.* Peter Cunningham, *Inigo Jones: a Life of the Architect*.

Jones, John Paul, a commander in the American naval service, was born in Kirkcudbrightshire, Scotland, in 1747, died 18th July, 1792. His father, whose name was John Paul, was gardener to the Earl of Selkirk. He entered the merchant service, was engaged in the American and West Indian trade, and is said to have realized a handsome fortune. On the outbreak of war between the colonies and the mother country he offered his services to the former, and in 1778, being then in command of the *Ranger*, he made a descent on Whitehaven, set fire to the shipping, and plundered the Earl of Selkirk's mansion. Next year, in command of the *Bon Homme Richard* (42 guns) and a small squadron, he threatened Leith, and captured the British sloop of war *Serapis* after a fierce engagement off Flamborough Head. On his return to America he was somewhat neglected by Congress, and in 1788 entered the Russian service with the rank of rear-admiral, but, owing to the jealousy of Russian commanders, soon retired from this service. He returned to Paris, where he died in poverty and ill-health.—*Cf.* R. M. Crawford, *The Sailor whom England Feared*.

Jones, Sir William, an English lawyer and Oriental scholar, born in 1746, died at Calcutta in 1794. He was educated at Harrow and Oxford, and early acquired a reputation as a linguist, Hebrew, Persian, Arabic, and even Chinese, besides German, Italian, French, Spanish, and Portuguese, being amongst his acquisitions. In 1770 his translation (in French) of the *Life of Nadir Shah* from the Persian appeared; in 1771 his *Grammar of the Persian Language*; in 1774 his *Poesies Asiaticæ Commentariorum, Libri Sex*; and in 1781 his translation of the seven Arabic poems known as the *Moallakat*. He had been called to the Bar in 1774, and in 1783 was nominated judge in the supreme court of judicature, Bengal, and knighted. Here he did much for the furtherance of Oriental studies, being one of the first Europeans to study Sanskrit, founding the Royal Asiatic Society, translating the *Sakuntala*, or *The Fatal Ring*, and the *Ordinances of Manu*, besides tales, poems, and extracts from the *Vedas*. He also undertook a *Digest of the Hindu and Mahomedan Laws*, which he did not, however, live to complete.

Jönköping (yeun-cheup'ing), a town of Sweden, capital of the län of same name, between Lakes Vättern and the Munkajö, which are connected by canal. The match manufactory is one of the largest of its kind. Pop. (1920), 28,873.

Jonquill (jon'kwil), a bulbous plant of the genus *Narcissus* (*N. Jonquilla*), allied to the daffodil. It has long lily-like leaves, and spikes of yellow or white fragrant flowers. The sweet-scented jonquil (*N. odorus*), a native of Southern Europe, is also generally cultivated. Perfumed waters are obtained from jonquil flowers.

Jonson, Benjamin, English dramatist, poet, and literary dictator, was born at Westminster in 1572, and died on the 6th Aug., 1637. Jonson's father, who, after being a sufferer in the Marian persecution, had become a minister, died before the poet was born, leaving his wife in straitened circumstances. Jonson was educated at Westminster School, owing, it is believed, to the kindness of Camden, who at that time was an assistant master there. It is a pious article of belief that Jonson continued his studies at St. John's College, Cambridge, but there is no actual proof of this, and if Jonson was in residence at all, it can only have been for a few weeks. Jonson's mother had re-married about two years after the birth of her son; her second husband was a master-bricklayer, and Jonson was put to work with him. He did not like this employment, so enlisted in the army and went to the Low Countries, where the English troops were fighting the Spaniards. He killed an enemy in single combat and took *opima spolia* from him. He soon returned to England, and began to work for the Admiral's company of actors both as playwright and actor. Some of his early plays were probably written in collaboration and were regarded by their author as hack-work, and so are not preserved. Meres in his *Palladis Tamia* (1598) mentions Jonson among the best for tragedy; but his early tragedies are lost. On 22nd Sept., 1598, Jonson killed a fellow-actor, Gabriel Spencer, in a duel; he was almost hanged for this breach of the peace, only escaping by benefit of clergy. He forfeited his goods and chattels, and was branded on his left thumb with the Tyburn T. During his imprisonment he became a Papist, and so continued for twelve years. In 1598 the first of Jonson's great plays, *Every Man in his Humour*, appeared at the Globe. Shakespeare was one of the cast, and there is a strong tradition that the play was accepted owing to his intervention. This play is of the greatest importance in English dramatic history, and is in itself an amusing and spontaneous play, which its author was not able to surpass for some seven years. Its companion piece, *Every Man out of his Humour* (1599) is much less pleasing. There is an undercurrent of bitterness running through it, and its humorous characters are caricatures of impossible persons. It has, however, several amusing scenes. *Cynthia's Revels*, performed in 1600 by the children of the

Queen's Chapel, is an unsuccessful return to Lylyesque allegorical comedy. It is very long, and has lost any sparkle which it ever possessed. *The Poetaster* (1601) is a much livelier play. It is a counter-attack upon Dekker and Marston, the latter of whom had already represented Jonson on the stage. It ends with a highly comic scene, borrowed from the *Lexiphanes* of Lucian, in which Marston vomits up all his crudities of diction. Jonson was disappointed with his success as a writer of comedies, and resolved to transfer his attentions to tragedy. *Sejanus* (1603) is the result. It is a very carefully written tragedy, which adheres most scrupulously to Tacitus and the other authorities, but it has little action, and fails to give almost everything that is required in a tragedy. A similar verdict may be given upon the other tragedy, *Catiline* (1611), where Jonson had a somewhat better subject, and treated it if anything less adequately. In 1605 Jonson returned to comedy; he collaborated with Chapman and Marston in a play called *Eastward Ho*. This play was considered by a sensitive follower of King James I to contain some unpardonable aspersions upon the Scottish nation. The three authors were imprisoned, Jonson, whose share in the play was a small one, voluntarily surrendering himself. The report was that they were to have their ears and noses cut, but they were released unpunished. In this same year Jonson's masterpiece *Volpone* was acted both at the Globe and at the two Universities. It is a scathing satire on greed and avarice, based in part upon some incidents in the *Satiricon* of Petronius. It is a well-constructed and marvellously clever play, but its subject is repellent, and there is no elementary goodness of heart in any of its characters. *Epicoene, or the Silent Woman* appeared in 1609; it is a masterpiece of farce, rather too absurd to be classed as comedy. It is perhaps the best-tempered of all the plays, and is well-constructed; though, being based upon a trick, it must have been more effective when new than it could be after the trick is known. *The Alchemist* (1610) is another masterpiece; it is a comedy dealing with cheats and gulls, and satirizing greed and lust. The last of the great plays is *Bartholomew Fair* (1614), a crude and realistic farce, which depicts low life in London with admirable, if sometimes unsavoury, fidelity. *The Devil is an Ass* (1616) marks a distinct decline. In it Jonson harked back to some features of the old morality-play, and though there is an amusing satire upon the 'projectors' of the time, the play as a whole is neither well-constructed nor witty. He did not write any more stage-plays until 1625, when *The Staple of News* appeared. It is an unsuccessful attempt to mix allegory and Aristophanic comedy. Swinburne praised it

excessively, but it has not many other admirers. *The New Inn*, produced in 1620, was a complete failure, and was not heard to the end. It is a play with a romantic plot more absurd than can be easily imagined. There are passages of fine writing in it, but as a whole it is marred by extravagance and improbability. *The Magnetic Lady* (1632) was intended to complete the cycle of plays dealing with 'humours', but it is a feeble play in comparison with its companion pieces. *A Tale of a Tub* (1633) is the last of Jonson's plays, though there is some reason to suppose that it is a youthful production of Jonson's which he refurbished in his old age. It is a good straightforward rustic farce with no pretence to depth, but much less tedious than the plays of Jonson's old age. When Jonson died, in 1637, he left two dramatic fragments behind him, one the beautiful pastoral play of *The Sad Shepherd*, of which nearly three acts survive, and the other a small fragment of seventy lines of a tragedy on *The Fall of Mortimer*. *The Sad Shepherd*, in spite of occasional lapses of taste, and displays of artificiality and *simplesse*, is a marvellous play, and has a rich vein of poetry and fancy in it. It makes us revise some of our opinions about Jonson. The fragment of *Mortimer* does not make us feel any regret that it was not completed. This concludes the tale of Jonson's dramatic work.

From 1605 to 1630 Jonson wrote many masques for performance at court. He was the principal masque writer of his time; if he did not invent the masque, he certainly brought it to perfection; after his death it fell into decay. Masques were in the main shows designed to display the expensive dresses and elaborate dances of the noble lords and ladies who performed in them. They did not give much scope to the librettist, and Jonson's masques do not rise above the level of mediocrity as poetry, though as masques they are the best we have. The best-known among them are: *The Masque of Queens* (1609), *Love Restored* (1611), and *News from the New World Discovered in the Moon* (1621). Jonson also wrote several 'entertainments', which were in some respects akin to masques, but not identical with them, their central feature being a speech of welcome, not a dance.

Jonson wrote a large quantity of verse of various kinds—epigrams, addresses, lyrics, elegies, and epistles; none of it, however, is of great importance, though much of it is well-expressed and weighty. Jonson had not the lyric touch—his best-known song, *Drink to me only with thine eyes*, being quite exceptional, as well as being based on some passages in the *Letters of Philostratus*. Some of his poems appeared under the title of *Epigrams* and *The Forest* in the folio edition of his works which was published in

1616. Others, under the title *Underwoods*, appeared in the 1640 folio.

Jonson left two incomplete prose works behind him when he died. One was *Timber, or Discoveries made upon Men and Matter*, which was long thought to be a series of somewhat disjointed but original essays, and which was extravagantly eulogized by Swinburne as such. It has now been carefully analysed, and appears to have been a sort of common-place book in which Jonson noted down passages which appealed to him, sometimes translating or adapting from the classics, and sometimes from contemporary classical scholars. The other work is an incomplete *English Grammar*, based closely on Lily's *Latin Grammar*, and interesting chiefly as illustrating the self-conscious nature of Jonson's craftsmanship.

The facts of Jonson's life during his prime and his old age may be briefly stated, as for the most part he led the uneventful life of a scholar and author. He went to France as tutor to Sir Walter Raleigh's eldest son in 1613. He journeyed to Scotland on foot, leaving London probably about June, 1618, and starting on his return journey on 25th Jan., 1619. He spent a fortnight or so in Dec., 1618, at Hawthornden with the poet William Drummond, who wrote notes of his conversations with Jonson, which, though somewhat desultory, remain the chief authority for many events in Jonson's life. These *Notes* were only published in a garbled form until 1842, when an edition of them was brought out by David Laing, who discovered a copy of the original version of the *Notes* in the handwriting of the antiquary Sir Robert Sibbald. In 1619 Jonson was created an M.A. of Oxford; in 1628 he succeeded Middleton as City Chronologer. In spite of an overwhelming tradition to the contrary, firmly embedded in all textbooks, Jonson was never Poet Laureate *de iure*; *de facto* he occupied a position somewhat equivalent to it. During his later years Jonson gathered round him many young men who loved to be called his sons, and he reigned as *dictator perpetuus* over a sort of club which met in the Apollo Room of the Devil Tavern. He was long in ill-health, suffering from dropsy, scrofula, gout, and paralysis. After his death he was buried in the north side of the nave of Westminster Abbey, and the inscription, 'O rare Ben Jonson' was cut on his slab by the order of a casual visitor.

Jonson is perhaps the greatest of all the Elizabethans after Shakespeare, and yet his plays are seldom read and never acted. His qualities arouse admiration rather than enthusiasm. He was a titanic workman with a strong sense of his own importance and an ever-present idea of the sacred nature of his mission

as a poet. He lacked the divine fire, and so was not successful in much of his work, though no one else has so nearly taken the kingdom of poetry by storm. His work is quite devoid of charm, whimsicality, and the capriciousness of the Comic Muse. The saving grace of nonsense rarely comes to his rescue. Yet he is a colossal figure in English letters, and is always wise and weighty in his thought. Above all, he is transparently honest, delightfully uncompromising, and unflinchingly manly in everything that he wrote.—BIBLIOGRAPHY: M. Castelain, *Ben Jonson: l'homme et l'œuvre*; G. Gregory Smith, *Ben Jonson* (English Men of Letters Series); A. C. Swinburne, *A Study of Ben Jonson*; J. A. Symonds, *Ben Jonson* (English Worthies Series); Sir A. W. Ward, *History of English Dramatic Literature*.

Joplin, city of Missouri, United States, with rich lead- and zinc-mines and smelting-furnaces. It was founded in 1838, and became a city in 1873. Pop. (1920), 29,002.

Jordaens (yor'däns), Jakob, historical and portrait painter, born at Antwerp in 1594, died 1678. He studied under his father-in-law, van Noort, as did Rubens, and has the reputation of being, after Rubens, Antwerp's greatest painter. His pictures, the subjects of which are mainly mythological or scenes from contemporary Flemish life, are to be found in the chief European collections. He has the same realism, rich colour, and technical mastery as Rubens, but lacks his imaginative power and dynamic energy.

Jordan, the largest river in Palestine, and one of the most celebrated rivers in the world. It rises from several sources, uniting in Bahr-el-Hülch, or the Waters of Merom. From this point it flows with a rapid current in a narrow rocky bed, and falls after a southerly course of about 10 miles into Lake Tiberias. Shortly after leaving the 'south end of this lake it enters a broad valley or ghor, called in the Bible 'the plain'; and continuing a southerly but singularly crooked course of about 70 miles direct distance, or 200 including windings, falls into the north end of the Dead Sea, having received the Zerka or Jabbok, also on the left, and numerous smaller affluents. The upper part of the valley of the Jordan is hilly, arid, and barren, but it becomes more level and fertile as it approaches the Zerka. The river is muddy and full of small fish. In the dry season it is shallow, with an average width of from 30 to 50 yards. At its mouth it is about 180 yards broad and about 3 feet deep. It is subject to great inundations during the winter season. The valley of the Jordan forms one of the most remarkable depressions in the world, the Dead Sea being 1812 feet below sea-level, and the total fall of

the river being about 2300 feet.—*CL.* Sir G. A. Smith, *Historical Geography of the Holy Land*.

Jornan'des (properly *Jordanes*), the historian of the Goths, and himself a Goth, was born about A.D. 500, was at first a notary, but afterwards took the monastic vows, and is said to have been appointed bishop of some Italian city, probably Ravenna or Croton. Of his two works the chronicle *De Regnorum et Temporum Successione* is of value only when it approaches his own time. The other work, *De Rebus Geticis*, treating of the Goths, based on the lost history of Cassiodorus, is invaluable.

Joseph, one of the two sons of the patriarch Jacob by his favourite wife Rachel. His father's preference for him drew down the enmity of his elder brothers, who sold him to some Ishmaellish slave-dealers, by whom he was sold to Potiphar, a distinguished officer in Egypt. The story of his elevation to the position of Vice-Regent of Egypt and the settlement of his father and brothers there is well known (*Gen.* xxxvii-1). Authorities still differ as to the period in Egyptian history to which Joseph's life belongs, some placing it before, others under, and others after the time of the Hyksos or shepherd kings.

Joseph, the husband of Mary the mother of Jesus, was a descendant of the House of David though resident at Nazareth, where he followed the trade of a carpenter. Early tradition represents him as an old man at the time of his marriage, and he seems to have died before the commencement of the public ministry of Jesus. His day in the Roman Catholic calendar is the 19th March.

Joseph I, Emperor of Germany, eldest son of Leopold I, born 1678; became emperor in 1705. He was a zealous member of the alliance against France in the War of the Spanish Succession, in which the victories of Marlborough and Eugène won glory for the imperial arms. He died in 1711.

Joseph II, German Emperor, son of Francis I and Maria Theresa, was born 18th March, 1741, and died in 1790. He was elected King of the Romans in 1764, and on the death of his father (1765) German Emperor, succeeding his mother, however, in the hereditary estates of the House of Austria only in 1780. He at once commenced an extensive scheme of reforms, but the country was not prepared for such sudden changes, and he was compelled to give up most of his plans. In 1788 he visited Catherine II at Kherson, and in league with her made war unsuccessfully against Turkey.

Josephine (zho-sä-fën), Empress of the French, was born in Martinique 23rd June, 1763, the daughter of Lieutenant Tascher de la Pagerie, and died 29th May, 1814. She married in 1779 Vicomte Alexandre Beauharnais, by whom

she had two children, Eugène and Hortense (afterwards Queen of Holland and mother of Napoleon III). In 1794 her husband, who had been commander of the army of the Rhine, was executed during the Reign of Terror. She herself had a narrow escape, having been proscribed. At the house of the famous Madame Tallien she met Napoleon Buonaparte, a young artillery officer who had distinguished himself at the siege of Toulon, and they were married in 1796. Her beauty and grace of manner greatly assisted her husband in the establishment of his power, and when she shared his throne, from 1804 to 1809, her court was brilliant, if extravagant. But the fact that the union was childless stood in the way of Napoleon's ambition to become the founder of a dynasty, and in 1809 Joséphine was divorced, retiring to her beautiful seat of Malmaison, retaining the title of empress, with an annual grant of two million francs.—BIBLIOGRAPHY: P. W. Sergeant, *The Empress Josephine*; F. Masson, *Josephine: Empress and Queen*; N. J. E. Méneval, *The Empress Josephine*; A. Dumas père, *Mes Mémoires*, Vol. I.

Joseph of Arimathæa, i.e. of Ramathaim in Benjamin, a member of the Jewish Sanhedrin, who, though a believer in Jesus, had not the courage to make open profession of his faith. Nevertheless, after the crucifixion he went to Pilate, begged the body of Jesus, and along with Nicodemus buried it in his own garden. According to tradition, he came as apostle to England, whither he brought the Holy Grail, and settled at Glastonbury.

Josephus, Flavius, the historian of the Jews, was born at Jerusalem A.D. 37, and was carefully educated. He spent three years in a desert with the hermit Banus, and adopted the views of the Pharisees. In A.D. 63 or 64 he was sent on a mission to Rome, to treat for the release of certain Jews sent in custody to the capital by the procurator Felix. On his return he found his countrymen preparing to throw off the Roman yoke, and, having tried in vain to persuade them of the hopelessness of such a struggle, he accepted the post of defending the province of Galilee, and actually held the fortified town of Jotapata against the whole Roman army for forty-seven days. He was captured at the fall of the city, was afterwards present in the Roman army at the destruction of Jerusalem (A.D. 70), and went with Titus to Rome, where, assuming the family name of his patron, Flavius, he lived in learned leisure. Here he wrote (in Greek) *The History of the Jewish War*; *The Antiquities of the Jews*, giving a history of the Jews from the earliest times to the reign of Nero; an *Autobiography*, mostly relating, however, to the time of his military

activity; a work on the *Antiquity of the Jewish People*, directed against Apion, an Alexandrian grammarian. The date of his death is uncertain. He certainly saw the end of the century.—Cf. E. Schürer, *History of the Jewish People in the Time of Christ*.

Josh'ua, the successor of Moses in the command of the Israelites, was the son of Nun, of the tribe of Ephraim. His name was at first *Hoshea* (help), but was changed by Moses into *Joshua* (Jehovah's help), of which *Jesus* is the Greek form. He was the only one, with the exception of Caleb, who brought back an encouraging report from the land of Canaan. Nominated by Moses to succeed him in the command of the army of Israel, he led the Israelites over the Jordan, and in the course of seven years conquered the greater part of Palestine, and divided the country among the tribes. He died at Timnath-Serah in Mount Ephraim at the age of 110. His history is contained in the canonical book which bears his name, and of which he has been usually regarded as the author; but modern critics have shown that it is a composite narrative, and contains references to many events which took place after Joshua's death.—Cf. Dillmann's *Commentary*.

Josi'ah, King of Judah, succeeded his father Amon at the age of eight years (639 B.C.). He is characterized in the Scriptures as doing "that which was right in the sight of the Lord". He took an active part in the reform of public worship, and commenced the restoration of the temple, during the progress of which the high-priest Hilkiah discovered the book of the law, thought by some to be substantially the same as the *Book of Deuteronomy*. The prescriptions it contained gave a decided direction to the reform movement which the king conducted with great vigour. In his thirty-first year, prompted probably by friendship to the King of Assyria, he marched out against Pharaoh Necho, who was on his way to attack that kingdom. The two armies met at Megiddo, where Josiah was slain.

Jósika (yó'shi-ká), Miklós, Baron, a Hungarian novelist, born in 1796, died at Dresden in 1865. He entered the Austrian army, but in 1818 resigned his commission, and settled down to literary work. Drawn into politics, he became a zealous supporter of Kossuth, and during the Revolution of 1848 was a member of the Committee of National Defence. On the fall of the revolutionary Government he escaped to Brussels, where he resided till 1864. Amongst the best of his novels are: *Az utolsó Bátori* (The Last Batori); *Zryni a Költő* (Zryni, the Poet); and *A' Csehek Magyarországnan* (The Bohemians in Hungary). Jósika was the founder of the historical novel of his country.

Jotuns (yó'tunz; Icel., giant, devoufer), in

northern mythology, immense giants and magicians who had command over the powers of nature, and lived in dark caves in their kingdom of Jotunheim, from which they waged perpetual war against the Æsir, the bright gods of Valhalla. Originally they represented the destructive forces in nature. They were cunning, malignant, versed in witchcraft, but not highly intelligent.

Joubert, Barthélemy Catherine, French general, born 1769, died 1799. The son of an advocate, Joubert was intended by his parents to follow his father's profession, and when he ran away to join the artillery, in 1784, he was immediately brought home, and eventually commenced the study of law at Lyons and at Dijon. In 1791 he enlisted in a volunteer corps, where his comrades elected him corporal and then sergeant, and he was promoted to a sub-lieutenancy in 1792. His brilliant defence of a redoubt against a whole battalion when only thirty men of his garrison were left alive, and in which engagement he was made prisoner by the Austrians, found him great favour in the eyes of Bonaparte, who, in 1795, made him a general of brigade. After his release on parole, while serving under Augereau in 1796, he became a general of division, and in Jan., 1799, he was made commander-in-chief. He fell among the first, mortally wounded, at the battle of Novi, 5th Aug., 1799.

Joubert, Petrus Jacobus, South African general, born in the Cape Colony in 1834, and died at Pretoria on 28th March, 1900. He removed to the Transvaal, where he became member of the Volksraad and then Attorney-General. During the first British annexation of the Transvaal he refused to hold office, and played a great part in the agitation that led to the war of 1880, when he became commandant-general of the Boer army. In 1893 and again in 1898 he unsuccessfully opposed Kruger in the presidential elections. He was commandant-general in the second Boer War till his death.

Jouffroy (zhô-frwä), Théodore Simon, a French philosopher, born in 1790, died at Paris in 1842. He was educated at the Colleges of Pontarlier and Dijon, and then studied under Victor Cousin. In 1817 he became a doctor of philosophy, and held the position of professor of philosophy in different colleges and normal schools; taught for some years in the Collège de France, and became a member of the Academy. In philosophy Jouffroy was mainly a follower of the Scottish school of Reid and Stewart, some of whose works he translated into French. His own principal works are *Mélanges Philosophiques* and *Cours d'Esthétique*. As an original thinker Jouffroy has no claim either to profundity or intellectual brilliancy, but he had a talent for

popular exposition, and followed prudent lines of speculation.

Joule, James Prescott, celebrated English physicist, born at Salford 1818, died 1889. His name is associated with some of the most important facts of physical science, and every student of natural philosophy is familiar with *Joule's Mechanical Equivalent of Heat* (usually denoted by the letter J), *Joule's Law of Heating* in an electric circuit, *Joule's Law* in thermodynamics, and the unit of energy called the *Joule*. His discovery of the law of heating in an electric conductor, viz. that the heat evolved in a given time is proportional to the resistance of the conductor, multiplied by the square of the current, was announced in 1840. At the meeting of the British Association in 1843 he read a paper *On the Calorific Effects of Magnetic Electricity and the Mechanical Value of Heat*, but his remarkable results attracted little attention. Even at the 1847 meeting, when he returned to the subject, his communication would again have fallen flat, had not a young man of twenty-three risen among the audience and declared his emphatic opinion that Joule had brought before them "a great truth, and a great discovery, and a most important measurement". The young man was William Thomson, afterwards Lord Kelvin. It was years after this, however, before Joule's views and results, of foundational value though they are in modern mechanical, electrical, and chemical science, came to be generally accepted by physicists and engineers.

Joule's final result was that "the quantity of heat capable of increasing the temperature of a pound of water (weighed in vacuo, and taken at between 55° and 60° F.) by 1° F. requires for its evolution the expenditure of a mechanical force represented by the fall of 772 lb. through the space of 1 foot". This value for the constant J was not improved upon for nearly thirty years. The number at present accepted is 778, instead of 772 (see *Heat*; Kaye and Laby, *Physical and Chemical Constants*).

Joule held no academic post, and carried out his experiments in his private laboratory. He was elected a Fellow of the Royal Society in 1850. He was awarded the Royal Medal of the Society for 1852, and the Copley Medal in 1860. In 1878 he was granted a Civil List pension of £200. His scientific papers (2 vols.) were published in 1885 and 1887.

Jourdan (zhôr-dän), Jean Baptiste, Count, marshal and peer of France, born 1762, died 1833. He distinguished himself under Dommouriez, was made a general of division in 1793, defeated the Austrians at Wattignies and at Fleurus, drove them beyond the Rhine, and took the fortress of Luxembourg, but was defeated at Höchst, and again at Würzburg (1796). In

1799, the Directory having given him the command of the army on the Danube, he crossed the Rhine at Basel, but was encountered by the Archduke Charles, who completely defeated him at Stockach. In 1808 he became a member of the Senate, and in 1804, on the establishment of the Empire, obtained the rank of marshal, the title of count, and a seat in the Council of State. After the Restoration he was raised to the peerage. He entered with spirit into the Revolution of 1830. His works include *Mémoires pour servir à l'histoire de la campagne de 1796*, and *Opérations de l'Armée du Danube*.

Journalism has of late become of increasingly great importance. This is the direct result of free education, which has made the reading public limitless, and is increasing the number of writers to an extraordinary extent. Everybody reads nowadays, and almost everybody is encouraged to write. There are newspapers for the nursery, magazines for elementary school children, reviews, fiction and other periodicals for boys and girls, so that by the time youth is reached the tendency to criticism has reached the cynical stage, and the satiated taste needs to be daily stimulated by appeals to the sensational, the unusual, and the piquant. The output of those journals which cater for impressionable young people with stories and articles of an exciting and highly imaginative character has reached enormous magnitude in recent years, and the desire to reach the same vast reading public, which does not think for itself, but avidly devours all that is put before it in a form to stimulate interest and expectation by a direct appeal to the senses, has completely transformed the character of the majority of the newspapers, and has affected all but a few of the staid reviews and periodicals. The greater portion of the press of to-day, from the daily newspapers to the weekly and even monthly publications, make no pretensions to supply anything more than ephemeral matter. To this is added the keen desire to appeal to the largest possible public by offering it far more than a record of events. Special features are organized—'stunts' is a term, conveying a certain amount of contempt, that is applied to them—and pursued with skill, ingenuity, and relentlessness to gain a particular end. That goal may be mere increased circulation, but it may also be a ruthless desire to score over a rival, secure the dismissal of a Cabinet minister or public servant, bring about a particular political or social policy, or even lure the people to wear a particular style of hat, or eat a special kind of bread. A newspaper or periodical will frankly seek to exert power in many and varied directions, and will subsequently boast of its achievement with perfect candour. Prize com-

petitions are a common feature, with rewards running frequently to enormous sums; other devices are adopted to secure large circulations, the most popular being an all-embracing insurance scheme. These, with illustrations comprising cartoons and photographs of events that happened but an hour or two back, together with pictures specially designed to interest very young children, women's and magazine pages, and learned and humorous articles, are regular features of the most staid daily newspapers. As a consequence the press appears to dominate all life; it is no longer content to reflect public opinion and to criticize; it seeks to guide, or to dictate. Judging by the circulations and by the preference of the advertisers, this is what the majority of the public demands. At the same time, the public has become a more outspoken critic. The press to-day, generally speaking, does not command the respect that it formerly enjoyed. Newspapers are at times openly condemned, and copies publicly burned, as a protest against a particular 'stunt', and the contempt with which the press as an institution and journalism as a profession has been treated has become painfully marked of late years. It has indeed become an established feature of public life for all types of people, from Cabinet ministers to street-corner tub-thumpers, to hold up the press to opprobrium on the slightest, or on no, pretext—a most undignified form of reproach, inasmuch as the tendency to seek publicity through the press is patent. Abuse of the press, whether it be by a sensitive member of Parliament, or an actress who demands praise at all times, has frequently led to absurd feuds, from which the only conclusion to be drawn is that all classes of the people expect nowadays that the press shall be subservient to them and shall not dare to disapprove of anything any person deems it correct to do. The power of the press, as the great medium of public censorship, is thereby seriously undermined, but it is still great, and, generally speaking, exercised with a high sense of responsibility and from a broad-minded standpoint. Side by side with the disfavour into which journalism has unfortunately fallen exists a curious and naive faith in it on the part of many persons, not all simple-minded, nor confined to the less educated classes. The lust for the power in the hands of the press is responsible for the ceaseless efforts of individuals and organizations to maintain their own papers; but the immensely increased cost of production, coupled with the fierce competition, makes journalistic enterprise extremely hazardous, and the mortality among newspapers and periodicals is heavy. Largely to combat these conditions, several huge concerns have been created, each controlling a number of newspapers and other

publications. Lord Northcliffe is at the head of the greatest of these combines, and controls an immense number of periodicals; other firms own several provincial newspapers, and the power in the hands of one large controller is therefore considerable, and not unappreciated by statesmen who seek to utilize it.

On journalism as a profession the effects have been various. The practice of journalism has been speeded up to such an extent that the old-fashioned easy-going 'Bohemian' is becoming a figure of the past; youth and vigour and a highly-developed sharpness, an instinct which is bluntly termed 'a nose for news' and for what the public wants, are the essentials for success. Pay is higher for the favoured, and the National Union of Journalists has managed to obtain a minimum wage for the rank and file. The increase in the number of the powerful syndicates, however, limits the scope of the workers, for such features as 'London Letter', &c., are duplicated to several papers. Still more serious to the professional journalist is the craze of many editors for names: an article is not judged on its merits, but on the popularity (which may be purely temporary) of the writer. People of momentary notoriety are asked to write articles, not always on the subject that has brought them into the public eye, and are paid big sums for their contributions. Frequently they are paid for their names only, the actual article being written by a journalist, sometimes as part of his ordinary duties. Outsiders are directly encouraged as a means of widening the area of supply, and indirectly stimulated to effort by the high figure often given in payment for a small item which happens to have come along at a very opportune moment. The trained and experienced journalist is, as a result, being reduced to the position of a mere hack, and he is the most successful hack who can most quickly read up and write up the particular topic needed by the ruthless and exacting machine of the daily press—a machine which practically never stops, for the work that goes to the making of a morning newspaper virtually covers all the twenty-four hours of the day, all the seven days of the week, and all the fifty-two weeks of the year. Schools and 'correspondence' agencies for the training of journalists have sprung up in recent years, and women are entering the profession in increasing numbers. But journalism, except for the favoured few who may choose their own subjects and write in their own time, is a most exacting occupation, calling for exceptional staying powers. See *Newspapers; Periodicals*.—BIBLIOGRAPHY: A. Andrews, *History of British Journalism*; A. E. Bull, *How to Write for the Papers*; M. Stark, *The Pulse of the World: Fleet Street Memoirs*;

M. L. Spencer, *News Writing*; H. Simonis, *The Street of Ink*; T. H. S. Escott, *Masters of English Journalism*; J. B. Williams, *The Beginnings of English Journalism*.

Jovianus, Flavius Claudius, Roman emperor, was originally captain of the household troops of the Emperor Julian, whom he accompanied in the disastrous campaign against the Persians in which Julian lost his life (A.D. 363). After Julian's death he was proclaimed emperor by the troops, but could only extricate his army by ceding to the Persian monarch the five provinces beyond the Tigris. He was found dead in his bed when on his way to Constantinople (364).

Jowett, Benjamin, English scholar, master of Balliol College, Oxford, born in 1817, died in 1893. He studied at Oxford, was elected to a fellowship in 1838, and became regius professor of Greek in 1855. In 1855 he published a *Commentary on the Epistles of St. Paul*. In 1860 appeared his *Essay on the Interpretation of Scripture* in the celebrated *Essays and Reviews*, for which he was tried on a charge of heresy before the Chancellor's court, but was acquitted. In 1870 he became master of Balliol, and in 1871 published his most important work, a translation of the *Dialogues of Plato*. He published translations of Thucydides (1881) and the *Politics* of Aristotle (1884). He was vice-chancellor of the university from 1882 to 1886.

Juan Fernandez, a group of islands in the Pacific Ocean, 38° 40' N. by 80° W., belonging to Chile, and forming a part of Valparaíso Province. The main island, Mas-a-Tierra (or 'landward'), 13 miles long by 4 miles broad, is composed of rocks of volcanic origin and densely wooded, was discovered by the Spanish Captain Fernandez in 1565, and has a good anchorage on its northern side. Alexander Selkirk, a Scottish seaman, was marooned here from 1704 to 1709, and his story is said to have inspired Defoe's *Robinson Crusoe*. Until 1913 the island was used as a Chilean penal settlement, and in 1914 a wireless station was established. Mas-a-Fuera (or 'seaward') Island is uninhabited, and Santa Clara or Goat Island, to the south-west, completes the group.

Juarez (hy-á-reth'), Benito Pablo, President of the Mexican Republic, born of Indian parentage in 1806, died in 1872. Elected President in 1861, he declared the suspension of public payments for two years to Europeans, a step which occasioned the interference of Britain, Spain, and France. Troops were landed in Mexico in 1862, but Britain and Spain retired, leaving Napoleon III to carry out his views alone. The Archduke Maximilian of Austria came, on Napoleon's invitation, to assume the throne, but Juarez, in spite of defeats and losses, continued to head a resistance, and when Napoleon,

under pressure from the American Government, withdrew his troops in 1866, the Republicans carried all before them. Maximilian was captured and shot, after a mock trial, on 19th June, 1867, and Juarez was re-elected to the Presidency (1867), which he held till he died.

Juba I, a king of Numidia and Mauritania in the first century B.C. On the breaking out of the Civil War Juba fought against Caesar; but after his total defeat at Thapsus, being abandoned by his subjects, he slew himself, 46 B.C.—His son, Juba II, was led in Caesar's triumph at Rome, was carefully educated, and, having gained the favour of Augustus, received in marriage the daughter of Antony and Cleopatra, and was restored to the kingdom of his father, 30 B.C., which some years after he exchanged for Mauritania. He wrote a *History of Rome* in Greek, a *History of Arabia*, treatises on the drama, painting, grammar, &c., of which only fragments are extant. He probably survived till A.D. 18 or 19.

Ju'bilee (Heb. *yobel*, *yobel*, blast of a trumpet), a festival of the Jews, held every fiftieth year. During this year all slaves or captives were released; all estates which had been sold reverted to their original proprietors or their descendants; and the ground was allowed to lie fallow. It has been doubted whether the law of jubilee was ever actually observed until after the return from the Babylonian exile, when, for a time at least, it came into operation.

In 1300 a *Roman Catholic Jubilee* was instituted by Pope Boniface VIII, who issued a Bull granting plenary indulgence to all pilgrims who should visit Rome that year and perform certain ceremonies. The result was a vast concourse of pilgrims, from whom the Church drew so much profit that in 1350 Clement VI declared a jubilee every fiftieth year, and in 1389 Urban VI every thirty-third, and in 1470 Paul II every twenty-fifth year. The Reformation, which interfered with the sale of indulgences, sensibly diminished both the enthusiasm and the profits. The last jubilee was held with great pomp by Leo XIII in 1900. The term jubilee is also applied to the fiftieth anniversary of a great event, and the sixtieth anniversary is called a *diamond jubilee*.

Judæ'a, a term applied, after the return of the Jews from exile, to that part of Palestine bounded east by the Jordan and the Dead Sea, north by Samaria, west by the Mediterranean, and south by Arabia Petrea. See *Palestine*.

Judas, surnamed *Iscariot*, meaning, perhaps, the man of Kerioth, a village of Judæa, was one of the Twelve Apostles of Jesus, and betrayed his Master into the hands of the Jewish priests for thirty pieces of silver. Remorse for his crime led him to suicide. The Canites, Cerinthians, and some other heretics held him in great veneration,

believing that he alone saw the necessity for bringing about the fulfilment of prophecy and the atonement for humanity. Others have thought that his object was to oblige his Master to use His miraculous power to defeat His enemies and establish the new earthly kingdom of the Messiah, in which Judas expected to have a high place.

Judas, or **Jude**, brother of James, one of the Twelve Apostles. Matthew and Mark call him *Thaddæus* surnamed *Lebbæus*. Nothing is known of his life. By many he is considered the author of the *Epistle of Jude*. See *Jude, Epistle of*.

Judas Tree (*Cercis Siliquastrum*), nat. ord. Leguminosæ, is a native of the Levant, Spain, south of France, Italy, &c. It grows to the height of about 20 feet, with pale-green leaves and beautiful purple flowers, which are eaten mixed with salad or made into fritters. *C. canadensis*, or red-bud, another species, growing in Canada and the United States, is smaller.

Jude, Epistle of, one of the books of the New Testament. Its canonicity was questioned by the primitive Church, and often since. The Asiatic Churches did not make use of it till the fourth century, nor was it known in the West till towards the close of the second. Its quotation from the apocryphal book of *Enoch* raised a prejudice against it, but it was eventually allowed to take its place as a portion of the sacred canon. It is a passionate denunciation of heretics and false teachers, and has been supposed by some to be written by Judas the brother of the Saviour, and not by Judas the brother of James.

Judge (Lat. *judex*), in the widest sense one whose function it is to hear and decide causes and declare the law. In practice, however, the term is not generally applied to magistrates, justices of the peace, and other minor judicial functionaries.

Judges of the superior courts are appointed by the Crown, but are independent of it. They hold office for life or during good behaviour, and can be removed only on an address of both Houses of Parliament. Judges of the inferior (or county) courts are nominated by the Lord Chancellor, and may be removed by him for misconduct. A judge of the High Court of Justice must have had ten years' standing at the Bar, whilst a judge of the Court of Appeal must have been a barrister for fifteen years or a judge of the High Court for one year. Inferior judges are barristers of at least seven years' standing. No judge may sit in the House of Commons.

In theory a judge has no concern with the making of the law, which is the function of the legislature (q.v.), but in actual practice, especially in less advanced communities, there frequently arise questions for which the law has

made no provision, and the judge is called upon to determine them. His decisions, especially if he is a superior judge, are followed in future cases, and indeed are binding on the lower courts, and consequently there results judge-made or 'case' law. Frequently a judge has also to determine the facts of a case, but in England this function is often assigned to a jury.

Superior judges are absolutely immune from the consequences of anything said or done by them in judicial proceedings. "It is a principle of English law that no action will lie against a judge of one of the superior courts for a judicial act, though it be alleged to have been done maliciously and corruptly." Inferior judges are privileged provided they do not act in bad faith or beyond their jurisdiction.

Generally, a judge must act when called on, but he may not do so if he has a personal interest in the case, unless it cannot be heard without him or the objection is competently waived. A common example of interest, objection to which is usually waived, is where a judge is a shareholder in a company which is a party to an action brought before him. See *Judgment; Jury; Justiciary Court; King's Bench; Session, Court of*; &c.

Judge Advocate-General, an official subordinate to the Secretary of State for War, having an office in London, and advising the Crown upon all matters of military law. Proceedings of all military courts-martial are submitted to him for confirmation, and he has the power to annul, quash, or revise any finding or sentence which may not be legally in order. Subordinate officials form a contact between London and Head-quarters of Commands on home establishment. Duties of a similar nature are carried out for the Admiralty by a *counsel and judge-advocate of the fleet*.

Judges, Book of, a canonical book of the Old Testament, so called because the greater part of the narrative is occupied with the history of the judges who were raised up to deliver their countrymen from the oppressions of their neighbours. The first chapter, although formally connected with the *Book of Joshua* by the opening sentence, evidently contains a separate portion of the history of the Israelitish invasion of Canaan, the first settlement, indeed, west of the Jordan, in which the tribes of Judah and Simeon play a distinct part in the conquest. The 6th verse of the 2nd chapter again connects the work with the concluding part of the *Book of Joshua*, and in the chapters which follow the history of the nation is written from an ideal and poetic point of view, which gives it unity, the judges being represented as successive rulers, although in most cases their history and influence were merely local. The third part of the book begins

at chapter xvii, and has no formal or chronological connection with what has gone before, and has sometimes been called an appendix.

Judgment, in law, the judicial determination and decision of a court in an action. It is either interlocutory or final. In the former case it is given only on some particular point or proceeding, and does not complete the action in the same way as the final judgment, upon which, unless it be appealed against, suspended, or recalled, execution may follow. On a jury trial the verdict of the jury precedes the judgment, which is based on the verdict. Whilst the term judgment applies only to the adjudication of a court of law, the term decree is employed to describe the determination of a cause by a court of equity.— Cf. A. C. Freeman, *The Law of Judgments*.

Judgment-debt, in law, a debt secured to the creditor by a judge's order, and in respect of which he can at any time attach the debtor's goods and chattels. Such debts have the preference of being paid in full, as compared with simple contract debts.

Judicial Committee of the Privy Council, an English tribunal for the disposal of appeals from colonial and ecclesiastical courts. The Judicial Committee was established by an Act in 1833, amended in 1895, 1908, and 1913. It consists of members of the Privy Council who are or have been judges in the highest courts, including the Lord Chancellor, lord chief-justices, judges, vice-chancellors, masters of the rolls, and also judges from the overseas Dominions, and two judges versed in Indian law.

Judicial Separation. In English law, by the Divorce Act of 1857 judicial separation may be obtained, by either the husband or the wife, on the ground of adultery, cruelty, or desertion without cause for two years and upwards, or by the wife, on conviction of the husband of aggravated assault. With regard to cruelty, the conduct complained of must be such as to cause "reasonable apprehension of injury, physical or mental, if cohabitation be resumed". Habitual drunkenness may justify separation, as may also persistent abuse and violent language. A judicial separation places the wife in the position of a *feme sole* during the continuation of the separation, and if she die intestate, her property is dealt with as if her husband were dead. On the other hand, her husband is in no way liable for her contracts or torts; but if he has been ordered by the court to pay her alimony, he will be liable for necessities supplied to her if he have failed to pay her alimony. Of course, since the marriage is not dissolved, neither of them can marry again during the life of the other, judicial separation being merely divorce *a mensa et thoro* (from board and bed), as distinguished from a full divorce

a *vinculo matrimonii* (from the bond of marriage). In Scotland the law is very similar. The grounds of separation are adultery and cruelty, and condonation or forgiveness is a good defence.

Judith, widow of Manasses, a Jewish heroine of great beauty, virtue, courage, and piety, whose history is given in the apocryphal book which bears her name, the author and age of which are unknown. Judith is represented as going out to the tent of Holofernes, an Assyrian general who was besieging Bethulia, the city in which she lived, charming him with her beauty, and taking advantage of the admission to his tent thus afforded to her, to cut off his head with his own sword while he slept.

Juel (yu'el), Niels, a Danish admiral, born in 1629 at Copenhagen, died 8th April, 1697. He served in the Dutch navy under Tromp and De Ruyter against the English and the Moors of Barbary, entered the Danish service in 1656, was made admiral, took the Island of Gothland from the Swedes in 1676, and defeated them the following year in the famous sea-fight in the Bay of Kjöge.

Juggernaut, a corruption of the Skt. *Jag-an-nātha* (*jag-an-nāt'ha*; 'Lord of the World'), the name given to the Indian god Krishna, the eighth incarnation of Vishnu, and to a very celebrated idol of this deity in a temple specially dedicated to Juggernaut at Puri, the modern provinces of Behar and Orissa, on the Bay of Bengal. It is a very rudely-cut wooden image, having the body red, the face black, and the arms gilt; the mouth is open and blood-red; the eyes are formed of precious stones. It is covered with magnificent vestments and seated upon a throne between two others—his brother Bala-Rama and his sister Subhadra, coloured respectively white and black. Great numbers of pilgrims, sometimes a hundred thousand, at the time of the festivals of Juggernaut, assemble from all quarters of India to pay their devotions at his shrine. On these occasions the idol is mounted on a huge car resting on sixteen wheels, which is drawn by the pilgrims; and formerly, it is said, people were wont to throw themselves under the wheels, to be crushed to death, believing that they would thus immediately enter heaven. These religious suicides have made the name of Juggernaut famous in the Western World. The practice, however, is now of rare occurrence; and indeed competent authorities maintain that such deaths were always accidental.—Cf. Sir W. W. Hunter, *Orissa*.

Juglанда'ceæ, the walnut tribe, a natural order of dicotyledonous plants, chiefly found in North America. They are trees with alternate pinnate stipulate leaves, and unisexual flowers, the males in catkins, the females in terminal clusters or loose racemes. Besides the walnut

the order includes the butter-nut and hickory.

Jugur'tha, a king of Numidia, a natural son of Mastanabal. Micipsa, his father's brother, and King of Numidia after Massinissa (149 B.C.), adopted him, and brought him up with his own sons, Adherbal and Hiempsal. Micipsa did his best to conciliate him, and declared him joint heir to the crown with his two sons. But after the death of Micipsa, Jugurtha had Hiempsal murdered and drove Adherbal from the country. Adherbal appealed to Rome, and after several Roman expeditions into Numidia, Jugurtha was captured (106 B.C.), led in the triumph of Marius at Rome, and finally thrown into a dungeon, where he was starved to death.

Ju'jube, the popular name of a genus of spiny and deciduous shrubs or small trees, genus *Zizyphus*, nat. ord. Rhamnaceæ. The species are numerous, and of several the fruit, which is blood-red or saffron-coloured with a sweet granular pulp, is wholesome and pleasant to eat. The common jujube (*Z. vulgāris*) is a native of Syria, from which it was introduced into Europe. The fruit is dried, and forms an article of commerce. *Z. Lotus*, which some believe to have given name to the ancient Lotophagi, or Lotus-eaters, mentioned by Homer (*Odyssey*, ix, 84), a shrub 2 or 3 feet high, is a native of Persia and the north of Africa. *Z. spina Christi*, or Christ's Thorn, is said to have furnished the branches of which our Saviour's crown of thorns was made.—The name jujube is also given to a confection made of gum-arabic or gelaïne, sweetened and flavoured so as to resemble the jujube fruit.

Jujuy (hū-hō'i), a town of the Argentine Republic, capital of a province of same name, is situated in the Rio Grande, was founded in 1592, and carries on an active trade with Chile and Bolivia. Pop. 6000.—The province has an area of 19,000 sq. miles, and a pop. of 76,000.

Julia, the only child of the Emperor Augustus, was his daughter by his second wife Scribonia, and was born 39 B.C. She was first married (25 B.C.) to her cousin, the young Marcellus, and afterwards to Marcus Vipsanius Agrippa, to whom she bore three sons and two daughters. On Agrippa's death, in 12 B.C., she was married to Tiberius, who left her on account of her licentiousness. Augustus banished her to Pandataria, a desolate island on the coast of Campania, ultimately allowing her to live in Rhegium. After the death of the emperor, Tiberius treated her with great severity. She died A.D. 14, in poverty and distress. Her son Agrippa had been put to death by Tiberius shortly before.

Julian, Flavius Claudius Julianus, a Roman emperor, whom ecclesiastical writers have sur-named the *Apostate*, son of Julius Constantius (brother of Constantine the Great), was born

at Constantinople 17th Nov., 331. When hardly six years old, his father and several members of his family were murdered by the soldiers of his cousin, the Emperor Constantius. He was brought up in the Christian religion, but being fond of literature and philosophy, he turned away from the gloomy piety and rude asceticism of his teachers to the cheerfulness of the old Greek philosophers. At the age of twenty he was a pagan at heart and a disbeliever in the divine origin of Christianity. The Emperor Constantius allowed him to go to Athens, where he gave himself up to philosophical pursuits and embraced paganism. Having received command of an army against the Germans, he defeated them at Strasbourg, and drove them beyond the Rhine. He also displayed great talent as an administrator in Gaul. The emperor now became jealous of Julian, and recalled his best troops under pretence that he wanted to employ them against the Persians. This order caused a rebellion among the soldiers, who proclaimed their leader Julian emperor in March, 360, in spite of his own resistance. Constantius prepared to proceed against him, but soon after died, and Julian was generally recognized as emperor. He began by putting a stop to many abuses, and limiting the splendour of his court, and was thus able to remit to the people the fifth part of all their taxes. He sought to restore the heathen worship in all its splendour, and on that account opposed Christianity as much as was in his power, without, however, persecuting the Christians themselves. He even sought to falsify the words of Christ by rebuilding the Jewish temple. In 363 he headed an expedition against the Persians, and took several cities, but was mortally wounded 26th June, 363. He was an able ruler, and had also a reputation as an author. Some of his works have come down to us, including speeches, letters, and satirical pieces; the latter are distinguished for wit and humour. He wrote also a work against the Christian religion, of which we have yet some extracts. There is an English translation of his works in the Bohn Library, and another in the Loeb Classical Library.—BIBLIOGRAPHY: G. Negri, *Julian the Apostate*; A. Gardner, *Julian, Philosopher and Emperor* (Heroes of the Nations Series).

Julien (zhū-lé-an), Stanislas-Aignan, the leading Chinese scholar of his day, was born at Orleans 1799, and died in 1873. Possessed of an extraordinary linguistic faculty, he taught himself Greek, English, Italian, Spanish, Portuguese, and German, and in 1823 commenced the study of Chinese under Abel Rémusat. At the end of twelve months he published a Latin translation of the philosopher Mencius. Henceforth ancient and modern Chinese, Mantchu, the Mongolian tongues, and subsequently San-

skrit, were the subjects of his exact and profound study. In 1832 he became professor of Chinese at the Collège de France; librarian at the Bibliothèque Nationale, 1839; president of the college, 1855; commander of the Legion of Honour, 1863. His most important work was entitled *Voyages des Pèlerins bouddhiques* (Paris, 1853-8). Among his other works are: *Industries anciennes et modernes de l'Empire chinois* (1860), and *Syntaxe nouvelle de la langue chinoise* (1860).

Julius, the name of three Popes.—Julius I, born in Rome, chosen Pope in A.D. 337, died in 352. He summoned a council which approved his conduct in sustaining Athanasius in his contest against the Arians in 342.—Julius II (Giuliano della Rovere), was elevated by his uncle, Sixtus IV, to the rank of a bishop and cardinal, was appointed Papal legate to France, in 1503 was elected Pope, and died 1513. Immediately on his elevation to the Pontificate he planned the complete re-establishment of the Papal sovereignty in its ancient territory, and the extinction of foreign domination and influence in Italy. Refusing to attend the Council of Pisa convened by the King of France, he in 1511 formed the 'Holy League', to which Spain, England, and Switzerland were parties. In 1512 he made open war against Louis XII. The French defeated the Papal army near Ravenna, but were soon after driven out of Italy. He is considered one of the most immoral of the Popes, but was a far-sighted and patriotic sovereign, and a liberal and judicious patron of art and literature.—Julius III (Giovanni Maria del Monte), a Roman of low birth, was made cardinal by Paul III in 1536, took an active part in the Council of Trent, as Papal legate, was elected Pope in 1550, and in the following year reopened the Council of Trent, which had been suspended for upwards of two years. He endeavoured to effect a union with the Nestorians, and commissioned Cardinal Pole to organize, in conjunction with Mary, the reunion of England with Rome. He died in 1555.—BIBLIOGRAPHY: L. Pastor, *History of the Popes*; M. Creighton, *History of the Papacy*.

July', the seventh month in the Christian calendar, having thirty-one days. In the Roman year it bore the name of *Quintilis*, as originally the fifth month. Its change of name to *Julius* was in honour of Julius Caesar, who was born on the 12th of the month. It was called *Hegmonath* and *Maedmonath* by the Anglo-Saxons.

Jumilla (hō-mēl'yā), a town of Murcia, Spain, and the terminus of the Alicante-Valencia-Jumilla Railway. It has exports of esparto, cloth, wines, and oil. Pop. 17,500.

Jum'na, a river of India, which rises in the Himālaya, in the native state of Garhwal, near Jumnotri, at the height of 10,840 feet. It flows in its upper course in a generally south-west direc-

tion, then bends to the south-eastward, and, passing the cities of Delhi and Agra, falls into the Ganges at Prayāga, 'the place of sacrifice', now known as Allahabad, after a course of 800 miles. Some trade is carried on by means of clumsy barques. Two important irrigation works—the Jumna Eastern and the Jumna Western Canals—derive their supply of water from this river. The former is 100 miles long, and irrigates about 250,000 acres annually; the latter has a length of 433 miles, and irrigates on an average about 300,000 acres.

Jumping-hare (*Pedetes caffer*), a leaping rodent found in South Africa, and so named from its general resemblance to a hare, and its jumping mode of progression, necessitated by the elongated nature of the hind legs. It is the type of a special family (*Pedetidae*) allied to the jerboa.

Jumping-mouse (*Zapus hudsonianus*) is found in Labrador and North America generally, but is especially an inhabitant of the fur territories. It belongs to the same family as the jerboa (q.v.).

Juna'garh, native state of Gujerat, Bombay Presidency, India; area, 3283 sq. miles. The surface is generally level, but rises on the Girnar Hills to 3600 feet. Irrigation is extensively required for agricultural purposes. The nawab or ruler pays tribute both to the British Government and to the Gaekwar of Baroda. Pop. 434,120. The capital, *Junagarh*, situated under the Girnar and Datar Hills, is one of the most picturesque cities in India, and contains some old Buddhist caves. Pop. 35,410.

Juncææ, or *Juncu'cææ*, the rush order, a small natural order of monocotyledons, so named from the typical genus *Juncus*. It is principally composed of obscure herbaceous plants with brown or green glumaceous hexandrous flowers, the perianth being in two series, as in Liliacææ, but calycine instead of petaloid. Some of them, as the common rush, are employed for making mats, chair-bottoms, and brooms.

June (Lat. *Junius*), the sixth month in the Christian calendar. It consisted originally of twenty-six days, to which it is said Romulus added four, and from which Numa took away one. Julius Cæsar again lengthened it to thirty days, and it has ever since remained unaltered. June was called *Sere-monath* (dry month) by the Anglo-Saxons.

Juneau, the capital of Alaska since 1906, on the Gastineau Channel, and on the route to Klondike; the centre of a considerable trade in an important mining and fishing district. It was founded about 1860. Pop. 3500.

Jung, Carl Gustav, Swiss scientist, native of Zürich, associated with Freud (q.v.) in the theory and early development of the system for

the analysis of mental processes known as psycho-analysis. A difference of opinion ended in an open rupture, and Jung subsequently returned to Zürich, where he founded a school of psychotherapy. His works include *Studies in Word Association* (1918).

Jungermanniaceæ, or *Jungermanniales*, a large family of Liverworts. Most of them have distinct leaves. They inhabit the trunks of trees or damp earth, in cool moist climates.

Jungfrau (yung'frou; 'Maiden'), a snow-clad mountain peak of Switzerland, in the Bernese Oberland, on the frontier of the cantons of Bern and Valais. It is one of the most magnificent of the Swiss mountains (height, 13,070 feet), and was first ascended in 1811. The ascent may now be made by railway and lift.

Jungle (jung'gl; Hind. *jungul*, waste land, desert), properly an Indian term applied to a desert and uncultivated region whether covered with wood and dense vegetation or not, but in English it is applied to land covered with forest trees, thick impenetrable brushwood, or any coarse rank vegetation.

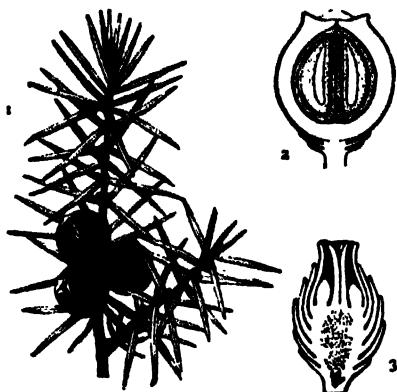
Jungle-fever. See *Tropical Diseases*.

Jungle-fowl, a name given to four species of Asiatic birds of the same genus as the domestic fowl, which is believed to be derived from one or other of them. Most probably the honour belongs to the red jungle-fowl (*Gallus ferrugineus*), which resembles the game breeds on a small scale, and ranges from North-East and Central India to the East Indies and Philippines. The grey jungle-fowl (*G. sonnerati*) is native to Southern, Central, and Western India; Lafayet's jungle-fowl (*G. lafayettii*), with a yellow comb edged with red, is indigenous to Ceylon; and *G. varius* inhabits Java, Lombok, and Flores.

Junin (hō-nēn'), a department of Peru, embracing the wildest parts of the Cordilleras; area, about 23,347 sq. miles; pop. 394,393.

Ju'niper, the name of hardy exogenous evergreen trees and shrubs of the genus *Juniperus*, chiefly natives of the northern parts of the world. They belong to the nat. ord. Coniferæ, group Gymnospermææ. About twenty species are known, the most important of which are the *J. communis*, *J. sabina*, or *savin*, *J. virginiana*, and *J. bermudiana*. *J. communis*, or common juniper, is a common bush growing wild in all the northern parts of Europe, and abundant on the mountains of Wales, Scotland, and Ireland, and on low ground in the northern parts. The berries require two years to come to maturity, when they assume a bluish-black colour. They are used extensively in Holland in the preparation of gin, which owes its characteristic flavour to them. They yield an essential oil, which is a powerful diuretic. *J. sabina*, or *savin*, also

yields a powerful diuretic, and an oil which is a local irritant. *J. virginiana* and *J. bermudiana* are trees. The former is the common red cedar of North America; the latter is known as Ber-



1, Branch of Juniper (*Juniperus communis*), showing berry-like cones. 2, Longitudinal section of cone. 3, Female flower.

muda cedar. Both yield a wood used in cabinet-making and in the manufacture of pencils.

Ju'n'ius, a signature attached to a famous series of seventy letters on public affairs which first appeared in *The Public Advertiser*, a London paper published by Woodfall, from which they were copied into most of the other journals of the time. The earliest is dated 21st Jan., 1769; the last, 21st Jan., 1772. After they were completed they were collected and published by H. S. Woodfall, with a dedication to the English nation and a preface by the author. Other letters bearing the same characteristics, but having different signatures, appeared between 28th April, 1767, and 12th May, 1772, and are given in the younger Woodfall's edition as the *Miscellaneous Letters*. This edition was published in 1812 in three vols., and included Junius's private letters to Mr. H. S. Woodfall, and a preliminary essay by Dr. J. Mason Good. An enlarged and improved edition was published in Bohn's *Standard Library*, edited by John Wade, with an essay by the editor in favour of the claims of Sir Philip Francis to the authorship. Although such an interval has elapsed since the publication of these papers, their authorship seems as far from being settled as ever. In seeking for a probable author of these letters the chief difficulty has been to find anyone who combined the knowledge, circumstances, distinctive opinions, and literary skill displayed by Junius. He supported the court party against America, favoured triennial Parliaments, and opposed the abolition of rotten boroughs. He was evidently well acquainted with court and

city politics, the management of public offices, the private intrigues of the time, and if not a lawyer he had considerable knowledge of law. Besides this, he seems to have been a man of rank and fortune, for we find him writing to Woodfall: "I am far above all pecuniary views"; and he expressly asserted that, "My rank and fortune place me above a common bribe". With these characteristics and this wide information he united a boldness, vehemence, and rancour which, combined with his epigrammatic and unsparing invective, rendered him an object of terror to those whom he attacked. Public suspicion at the time was fixed most strongly on Burke and Viscount Sackville. But Burke denied the authorship spontaneously to Dr. Johnson, and apart from considerations drawn from his temper, style, and turn of thinking, on several points Burke and Junius were in direct opposition to each other. That Viscount Sackville was the author received considerable belief at the time. His rank, fortune, temper, and talents concur to make it probable, while the friends and enemies of Sackville and Junius coincide. Yet the proof is far from complete in favour of this hypothesis. An attempt was also made to show that Lord Temple was the author, on the ground that the political and personal connections of Junius and Lord Temple were the same, and that his talents, age, circumstances, and style of writing and thinking rendered the hypothesis probable. The opinion that Sir Philip Francis (died 1818) was Junius has been probably the most common. See *Francis, Sir Philip*. The best edition of the letters is that already mentioned, by J. Wade.

BIBLIOGRAPHY: H. R. Francis, *Junius Revealed*; J. Smith, *Junius Unveiled*.

Jun'ius, Franciscus, Dutch scholar, born 1589, lived for about thirty years in England, then in Holland, and died at Windsor in 1677. Of Old-English and the ancient Germanic literatures he had an extensive knowledge; he published a glossary of Gothic (*Glossarium Gothicum*, 1664-5), and a work on English etymology (*Etymologicum Anglicanum*), and left a valuable collection of MSS. He also wrote a work entitled *De Pictura Veterum* (1637), and published the first edition of the Gothic Gospels of Ulfilas (1605).

Junk (Mal. *tejong, jong*, ship), a flat-bottomed ship, very seaworthy but clumsy, used by Chinese and Japanese. It has a high fore-castle and poop, and ordinarily three masts of considerable height, each mast being in one piece, with a lug-sail, generally of bamboo splits. The bow is bluff, the stern full, and there is a very large rudder. The term *junk* is applied by sailors to obsolete gear and to certain kinds of stored and salted meat.

Jun'o, the principal Roman goddess, sister and wife of Jupiter; the equivalent of the Greek

Hera. She was the queen of heaven, and under the name of Regina (queen) was worshipped in Italy at an early period. She bore the same relation to women that Jupiter did to men. She was regarded as the special protectress of whatever was connected with marriage, and women



Junk

from birth to death had her as a tutelary genius. She was also the guardian of the national finances, and a temple, which contained the mint, was erected to her under the name of Juno Monëta on the Capitoline. See *Hera*.—BIBLIOGRAPHY: L. R. Farnell, *Cults of the Greek States*; Sir J. G. Frazer, *The Golden Bough*.

Junot (zhü-nō), Andoche, Duc d'Abrantès, Marshal of France, was born in 1771, and died 1813. He was intended for the Bar, but on the outbreak of the Revolution joined a volunteer battalion, and at the siege of Toulon, in 1793, he became secretary to Napoleon, whom he accompanied into Italy in 1796 and Egypt in 1798 as aide-de-camp. In 1800 he was made Commandant of Paris, and he particularly distinguished himself at the battle of Austerlitz in 1805. In 1807 he was sent with an army into Portugal, and made his entry without opposition into Lisbon, his success being rewarded with the title of Duc d'Abrantès. Defeated by the British at Vimiera, he was obliged to submit to the humiliating Convention of Cintra, and to evacuate the occupied territory. Although he subsequently took part in the campaigns against Austria (1809), against Spain

(1810), and against Russia (1812), he failed to retrieve his reputation, and fell into disfavour with Napoleon. In 1813 he became insane, and committed suicide by leaping from a window. The Duchesse d'Abrantès wrote voluminous *Mémoires*.

Junta (Spanish, an assembly), in Spain, a high Council of State. It was originally applied to an irregularly summoned Assembly of the States, as distinguished from the Cortes or Parliament regularly called together by the authority of the king.

Jupati Palm (ju-pá-tě'; *Raphia tadigera*), a palm which grows on the rich alluvial tide-washed soil on the banks of the Lower Amazon and Pará Rivers in Brazil. The trunk is only 6 or 8 feet high and 1 foot in diameter. The leaves rise nearly vertically from the trunk, bending out on every side in graceful curves, forming a magnificent plume 70 feet in height and 40 feet in diameter. Leaves have been measured 48 and 50 feet long, and even these are not the largest. The leaf-stalks, which measure from 12 to 15 feet in length, are used for a variety of purposes, as for the walls of houses, baskets, and boxes. An African species (*R. Ruffia*) yields fibrous filaments (*raphia fibre*), imported into Europe for tying plants, &c. See *Raphia*.

Ju'piter, or **Juppiter**, the supreme deity of the Latin races in ancient Italy, the same as the Greek *Zeus*, and the Sanskrit *dyau*s (which means the sky); the second part being the same as the Latin *pater*, father. As the supreme deity Jupiter received from the Romans the title of *optimus maximus* (best greatest), and as the deity presiding over the sky he was considered as the originator of all the changes that took place in the sky. From him accordingly proceeded rain, hail, and the thunderbolt, and he it was that restored serenity to the sky after it had been obscured by clouds. Hence the epithets of *Pluvius* (rainy), *Tonans* (thundering), &c., were applied to him. The most celebrated of his temples was that on the Capitoline Hill dedicated to him as Jupiter Optimus Maximus, jointly with Juno and Minerva. He was represented with a sceptre as symbolical of his supreme authority. He maintained the sanctity of oaths; he was the guardian of all property; and every Roman was believed to be under his protection, and that of his consort Juno, the queen of heaven. White animals were offered up to him in sacrifice, his priests wore white caps, and his chariot was represented as drawn by four white horses.—BIBLIOGRAPHY: L. R. Farnell, *Cults of the Greek States*; A. W. Cook, *Zeus, God of the Bright Sky*.

Jupiter is the largest planet of the solar system and the fifth (excluding the asteroids) in order of distance, revolving at a mean distance from the sun of 483 millions of miles, in a period

of 11.86 years. Its equatorial diameter is about 88,700 miles, and polar diameter about 82,800 miles. Its volume is over 1300 times the earth's, but, being much less dense, it possesses only 318 times the earth's mass. The planet's equator is inclined only about 3° to the plane of its orbit. Jupiter's retinue of satellites consists of (a) four principal satellites (I to IV in order outwards) and the tiny innermost satellite (V), all revolving practically in the equatorial plane (V revolves in about twelve hours; IV, which is over a million miles distant, in sixteen and two-third days); (b) VI and VII, about 7 million miles distant, and revolving in about nine months (their orbits are highly inclined, and are interlocked like two links of a chain). (c) VIII and IX, over 14 million miles distant, and revolving in about two years (their orbits also interlock, and in contrast to the other seven they travel in the retrograde direction). The four principal satellites, which were discovered in 1610 by Galileo, present interesting phenomena of eclipses, transits, &c.; III, and probably also IV, is slightly larger than Mercury. The other five, discovered between 1892 and 1914, are all very small bodies, IX being estimated as some 15 miles in diameter.

Jupiter's surface is divided into a number of zones, by belts parallel to its equator. These are more or less permanent characteristics, but show slight variations of form, colour, and intensity. Spots and markings appear and disappear from time to time. The Great Red Spot, lying against a bay or hollow on the southern edge of the south equatorial belt, has been a remarkably persistent feature, existing for nearly fifty years, or possibly much longer. The South Tropical Disturbance, in the south tropical zone, has been seen since 1901, and stretches about half-way round the planet. These markings became nearly obliterated in 1919, apparently through overlying vapours, as they subsequently recovered their prominence. The equatorial zone, between the north and south equatorial belts, rotates in about nine hours fifty minutes. Beyond these belts the period is five to six minutes longer (see *Sun*). It is evident that we do not see any solid globe of Jupiter, but only the upper surface of a turbulent envelope of cloud. The planet must be in a state of intense heat, and though no longer self-luminous, still in a partially sun-like condition.

Ju'ra, an island of Argyllshire, Scotland, one of the Inner Hebrides, separated from Islay by a strait 1½ miles wide, having the whirlpool of Corryvreckan between it and the Island of Scarba. Its general aspect is exceedingly wild and rugged, and it is chiefly devoted to the rearing of cattle and to deer forests. A ferry connects Jura with the mainland. Pop. 448.

Jura (shū-rā), a department in the east of Vol. VII.

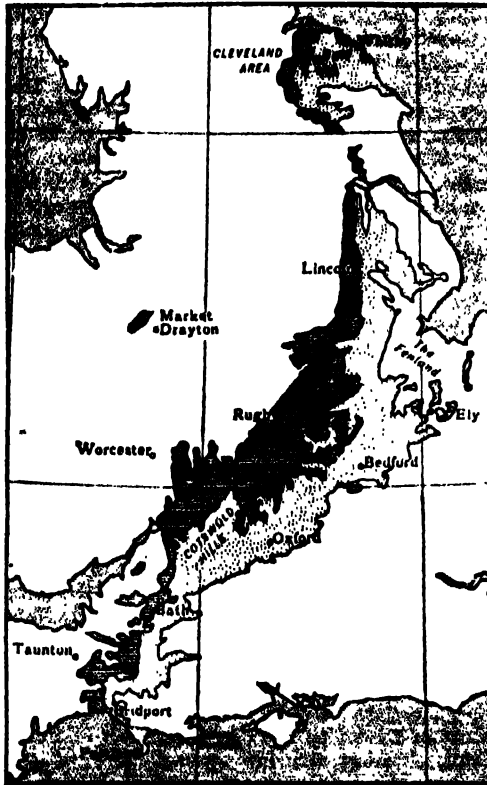
France, bordering on Switzerland; area, 1951 sq. miles. A large part is covered by the Jura Mountains, and it is drained by the Ain and the Oignon. It is a great dairying district, and Gruyère cheese is extensively made. Iron, marble, and alabaster are worked, and there are also salt springs. Lons-le-Saunier is the capital. Pop. 229,026.

Jura, a chain of mountains in Central Europe, partly belonging to France, partly to Switzerland, between which they form a natural barrier, extending from south-west to north-east, and exhibiting a number of parallel ridges. The greatest length is some 200 miles, from Belley in France, department of Ain, to the banks of the Rhine; and the greatest breadth about 65 miles, between the Lake of Geneva and the banks of the Doubs. The principal geological formation is the Jura limestone, with green-sand, belonging to the Lower Cretaceous series. Stalactite caves are numerous. The two chief rivers which have their source in the chain are both French—the Ain and the Doubs—and, descending from its western slopes, belong to the basin of the Rhône. Its highest points are Crêt de la Neige, Reculet (or Reculet de Thoiry), Mont Tendre, and la Dôle, the heights of which are respectively 5655, 5645, 5515, and 5505 feet.

Jurassic System, a system of strata in the Mesozoic group, between the Triassic and the Cretaceous, formerly divided in Britain into two sections, the Liassic below and the Oolitic above. The term Lias has become adopted in various countries as a synonym for the lowest of the three series now classed together as Jurassic, from their development in the Jura Mountains. In Germany these series, in upward sequence, are styled the Black, Brown, and White Jura. The Jurassic strata are well developed in England from the coast of Dorset to the Cleveland Hills of Yorkshire, forming the low ground east of the Severn, the bold escarpment of the Cotswold Hills, the promontory of Portland, and the picturesque country around Oxford. They are concealed by Cretaceous beds on the east, but emerge again in the Côte-d'Or area above Dijon and in the folded masses of the Juras. The lithological variety of the strata, formed in a warm sea of no great depth, and their richness in fossil remains, have led to important series of memoirs in most European languages, while the terrestrial Jurassic beds of the Central United States have furnished Marsh, Cope, and their successors with a magnificent sequence of vertebrate remains. The occurrence of a delicately stratified limestone, the lithographic stone of Solnhofen and Eichstätt in Northern Bavaria, in the Upper Jurassic series has made known, in the form of casts, the soft parts of several extinct organisms, including the wings of flying

reptiles and the feathers of the earliest known bird.

The fauna of Jurassic times shows a comparatively rapid development of that of the Triassic beds of the Alpine region. The brachiopods, so varied in Palaeozoic times, are practically restricted to the modern types *Terebratula* and *Rhynchonella*; but the mollusca are very varied,



Map showing area occupied by Jurassic Strata in England.

Lower Jurassic (Liasic) shaded heavy horizontal lines;
Middle and Upper Jurassic (Oolitic) dotted.

culminating in a wealth of ammonites, which have been used as zone-fossils in tracing the subdivisions of the beds. The fish still retained cartilaginous skeletons, and were mainly protected by their bony scales; the labyrinthodont amphibians of the Permian and Trias had, however, passed away. The earth was now given over to the reptiles, which spread their dominion over the land, the ocean, and the air. The dinosaurs, which often assumed a bipedal gait, attained enormous sizes, 100 feet and more in length, in the American and Central African regions. Giant forms are traced in the shore-deposits of Jurassic times in England. Allied

to these, the small *Compsognathus*, with bird-like features in its bone-structure, is found in the lithographic stone of Germany side by side with *Archaeopteryx*, which links the reptiles with the feathered race of birds. The mammals remained of humble type, monotremes and marsupials, if we may judge from remains that mostly consist of lower jaws and teeth. The flora included numerous conifers and cycads, but was essentially cryptogamic or gymnospermous. The Jurassic period, viewed as a whole, has been justly called the age of reptiles.

The beds in England have provided so fertile a field for stratigraphers and palaeontologists that it may be convenient to cite their broad divisions in a table:

Upper Jurassic.	Purbeck Beds (passage-beds to Wealden). Portlandian. Kimmeridge Clay. Oxfordian (Coral Rag and the underlying Oxford Clay).
Middle Jurassic	Bathonian. Inferior Oolite. Midford Sands (link with Lias).
Lower Jurassic.	Upper Lias. Middle Lias. Lower Lias.

Beds of Lower and Middle Jurassic age in England contain valuable stratified ores of iron, mainly formed by the substitution of iron carbonate for limestone. The oolitic limestones of Bath and Portland are valuable building-stones.

Jurat, in English law, that portion of an affidavit which narrates when, where, by whom, and in whose presence the oath was taken. Also, the title of the members of the Royal Court of Justice of Jersey and Guernsey.

Jurisprudence. *Juris prudentia* among the Romans originally signified knowledge of the law as possessed by a practising lawyer at Rome. Later it took a much wider meaning, and came to be conceived of as a branch of philosophy. Thus Ulpian in a well-known passage defines jurisprudence as "the knowledge of things human and divine, the science of the just and unjust". The Romans had thus risen to the conception of jurisprudence as a science of legal principles not confined to one, but underlying the laws of all countries and constituting a law of nature. This furnished an ideal standard or criterion by which the validity of actual laws could be determined and their defects remedied.

Similarly in modern popular phraseology we sometimes find 'jurisprudence' pompously used in its original practical sense, as when we speak of the 'jurisprudence of France', when the

simpler word 'law' would serve. But the term jurisprudence is more properly restricted to the philosophic and scientific investigation of legal systems, the science of philosophy concerned with an examination of the principles which underlie the legal relationships of mankind and the legal rights and duties to which those relationships give rise. The study of the science might be confined to the legal system of one country, but as it is desirable that the data should be as wide as possible, it has usually been undertaken from the point of view of comparative law. The legal systems of various countries are examined in detail, and after a process of selection, comparison, and classification we arrive inductively at certain universal principles underlying the concrete laws so examined. This unity, established by the method of 'comparative jurisprudence', arises from the common nature of man and the essential identity of the structure of human society in every State despite accidental, and, therefore, for the purpose in hand, negligible variations. This identity, recurring in all ages and in all countries, results in a permanence and identity in the legal ideas and method which determine the relations of man to man in their outward acts. Law prescribes rules consonant with the nature of man as a being in whom reason is the predominant element. The sphere of law is narrower than that of morality. Whereas morality deals with the whole of conduct, including thought, feeling, and intention, law is concerned only with those parts of conduct affecting the community. The line of distinction between law and morality is differently drawn in different communities, depending on their stage of development. The rules which regulate these relations come into being in two main modes. (1) Even before the organization of the community into a State, a series of customs arises regulating the most common relations of life, and spontaneously observed by all classes of the population. Such customary rules, based at first on reason and common sense, come to be followed with unquestioning obedience. (2) After the organization of the State, rules are consciously imposed by the supreme political authority. Thus in every system of national law we have two classes of rules: one, originating at first direct from the people, and later enforced not by public opinion but by the political authority; the other consisting of enactments laid down by the political sovereign. Differing in origin, both of these sets of rules draw their validity from the express or tacit acquiescence of the State. The topics of these rules or laws which thus come under regulation by the State are family relations, the security of property, the safeguarding of individual liberty, the enforcement of contracts, and the prevention of

crimes. The object of these rules is the creation and protection of legal rights, or, expressed otherwise, the creation and enforcement of legal duties: duty and right being correlative. Law is a necessary product of the complexity of life in a State. Regarded at first by the individual as a restraint, law comes to be recognized as the foundation and source of freedom in imposing general rules to which all must conform. It realizes freedom in formulating rules in accordance with which each can live, without encroaching on the freedom of others.

The subject-matter of law consists of legal rights. Before such rights can be classified according to some intelligible principle, it is necessary to have a knowledge of some elementary conception involved in every right. These elements are persons, things, and acts--the persons clothed with rights, the persons against whom rights are available, the things or objects over which rights are claimed, the acts of which the person who has the right is entitled to exact performance. A person is one possessed of a status or capacity for legal rights or duties, and may be either a natural individual human being, or a juristic person like a corporation composed of individuals and treated for the purposes of law as being a unity and as possessing some of the attributes of human beings. Thing is the object of a right, and may be either a material thing or an incorporeal thing (e.g. a patent) which the law regards as if it were a material object and capable of transfer. An act in the legal sense is a determination of will producing an effect externally. A consideration of each of these elements leads to a great variety of subtle distinctions which have to be carefully weighed by courts of law. Thus under the conception of person we may have to consider the effect of minority, sex, or sanity on legal capacity. Again, things, though physically divisible, may be regarded by law as indivisible. Under act, which involves will and consciousness, arise problems connected with force and fear and fraud, ignorance and negligence.

In their efforts to produce a science of philosophy of law, in which all the departments of law would be clearly marked off and defined, and its topics symmetrically and logically arranged, jurists have sought for a criterion or principle of division which might be regarded as decisive. Accordingly some have divided the whole province of law into the law of persons and the law of things. Continental jurists, on the other hand, followed in this country by Professor Holland, have adopted the classification of Roman jurists into public law and private law as crucial. The criterion or principle of division here is whether or not the State is directly concerned as a party. The State, for

its own preservation and for the adequate accomplishment of the purposes for which it exists, is conceived of as having rights which it may enforce and which when infringed it may punish. Under public law are embraced (1) constitutional law, which defines the form of government, the depositaries of the legislative, executive, and judicial functions, and determines the limits of administrative authority. (2) Administrative law, which regulates the machinery by which the State conserves its own existence and provides for the material and moral welfare of the people. (3) Criminal law, which contains a classification of criminal acts and their penal consequence. The basis of the law of crime is the conception which slowly evolves that by some acts the State as a corporate whole is more directly injured and menaced than by others. In primitive societies even violent wrongs were regarded as concerning exclusively the person injured, who was left to exact for himself reparation for wrongs.

The second great division is private law, where both parties are private persons and the State is not involved except as an arbiter. Under this division is embraced (a) the relations of family life, the rights and duties of husband and wife to each other and their children, the modes of constituting and dissolving the marriage tie; (b) the forms and conditions of ownership of land and other classes of property, the extent and nature of rights of property, and the modes of vindicating such rights when infringed; and (c) the binding force of contract. These topics form a conspicuous portion of the law of every advanced community, and suggest a natural method of classification into distinct categories of law. These categories, provided by the scientific methods of jurisprudence, are, of course, not readily intelligible unless illustrated by reference to a concrete system of law.

The great writers on jurisprudence have adopted different methods of dealing with the material of the science, giving rise to three schools: the Analytic, the Historical, and the Philosophic or Rational, of which the chief exponents are Holland (jurisprudence), Maine (ancient law), and Kant (philosophy of law).

Jury and Jury Trials. The origin of trial by jury is not traceable to any single legislator or any particular period. It seems to have had its beginning in certain primitive customs of the northern European races, and received special developments from different nations. By the Anglo-Saxons a person who was accused of crime was permitted to summon twelve of his neighbours, called compurgators, who swore to his innocence. This was the origin of an institution which took settled and vigorous form after

the Norman Conquest, gradually developing into its present form.

In criminal trials two juries act, the *grand jury* and the *petty jury*. The *grand jury* may consist of any number more than eleven and less than twenty-four men, who have been summoned by a mandate from the sheriff of the county. Their names are returned on a piece of parchment which is called a *panel*. The oath having been administered, they are usually instructed by the presiding judge in the nature and number of the offences about to be brought before them. They then proceed to consider in private the statement or *indictment* which is brought against the accused by the prosecution. Should they agree, to the number of twelve, that the accusation has a basis of truth, they bring into court what is called 'a true bill'. If, on the contrary, they find that there is no sufficient foundation for the accusation, they *ignore* the bill, and require the dismissal of the accused. When a true bill is found by the grand jury, it usually forms the basis of the subsequent prosecution. The grand jurymen are qualified by being a freeholder of his county, to what amount is not clearly defined.

Petty or *petit juries* consist of twelve persons, and no more, for the trial of all criminal offences, and of all issues of fact in civil cases at the common law. To act as jurymen any man is qualified who, being above the age of twenty-one and under sixty, has £10 yearly in freehold or copyhold, or £20 in leasehold, or who, within the same county, has paid an inhabited-house duty on a value of not less than £30 in Middlesex, or upon £20 in any other county, or who occupies a house with not less than fifteen windows. Peers, members of Parliament, judges, clergymen, barristers, solicitors, physicians, surgeons, pharmaceutical chemists, naval and military officers, &c., are exempt. Aliens who have been domiciled for ten years are qualified; convicts and outlaws are disqualified. Women who have the requisite qualifications as above are liable to serve as jurors, and in any panel the number of women is to bear to the number of men as nearly as possible the same proportion as appears on the list from which the panel is chosen. If a special jury is demanded, higher property qualifications are required in those fitted to act as jurors. In the case of persons summoned to serve on any of the inferior courts, the fine in case of default is not to be more than 40s. or less than 20s. The jury is selected by ballot from those summoned. If all the jurors do not appear, or any of them are justly objected to and set aside, in virtue of the right of challenge exercised by the parties to a suit (see *Challenge*), the deficiency may be supplied from among the bystanders having suitable qualifi-

cations. The jury being then sworn is placed in the jury-box, and the evidence given. No juror is at liberty to leave the box without permission of the court. Unless the case be one of murder, treason, or treason felony, the jury may be allowed to go home at any stage prior to the judge's summing-up, on engaging not to allow themselves to be spoken to on any subject connected with the trial. When the prisoner is charged with murder, treason, or treason felony, the jury are usually allowed to retire only in custody of the sheriff and his officers, who are sworn to keep them together, and not to speak to them with reference to the trial. When the evidence has been led, it is usual for the presiding judge to instruct the jury in the points of law which apply to it. It is thus that their duties are divided—the jury dealing with the facts, and the judge with the law of the case. The jury usually form an independent judgment upon the facts, and their finding is considered final. To consider their verdict they usually withdraw to a private room, where no intercourse with other persons is permitted, and where, when the session is protracted, food and other necessaries are supplied. Upon returning into court they publicly assent to such verdict as they have agreed upon. If they fail to agree among themselves, the jurymen are discharged by the judge, and the cause can be tried anew. In civil cases a majority verdict may be given, if the parties agree to this.

Another kind of jury is the *coroner's jury*, summoned to inquire into cases of sudden or violent death. The inquiry is made in presence of the body, and at the place where the death happened. The jury may consist of any number above eleven, and usually numbers twenty-three; twelve must concur in the finding. The persons found guilty are reserved for trial by a petty jury.

In Scotland there is no coroner's jury, and the only case in which a grand jury is summoned is that of treason. In all other criminal trials in Scotland the jury consists of fifteen jurors, and a majority is sufficient to convict. In civil cases the number of jurors is, as in England, twelve, and they must as a rule be unanimous before they give any verdict. As in England, jurors are either special or common. The qualification of a common jurymen is that he be between the ages of twenty-one and sixty, and in the receipt of £5 yearly as heritage, fee, or life-rent, or has movable property valued at £200. Any juror who fails to appear without sufficient excuse given is liable to be fined in a sum not exceeding £5, and not less than £2. Besides the verdicts of 'guilty' or 'not guilty', it is permitted to the jury in Scotland to return a verdict of 'not proven'. This releases the person, but stains the character of the accused.

In the United States, in Canada, and the other British colonies, jury trials are essentially the same as in England. In France they are only applicable to criminal cases, and the verdict is returned by a majority. Trial by jury is in force in Italy, and in Germany.

Jus Gentium, those principles which the Romans found to prevail in common among the Italian tribes. Later applied to the law presumed to be common to all men before the creation of States. It is to be distinguished from International Law, which regulates the relations of States *inter se*.

Jus Mariti, in Scots law, the right of ownership which a husband formerly possessed over his wife's moveable estate, whether possessed by her at the date of the marriage or acquired thereafter, unless the right was excluded by antenuptial contract or by the party from whom the estate was derived. Legally, it was his own absolute property. From 1861 onwards the right was gradually curtailed, and in 1881 it was abolished as regards marriages contracted and property acquired thereafter. The husband's right of administration (*jus administrationis*), whereby his consent was necessary to the disposal of the corpus of her estate both heritable and moveable, was, however, retained, and did not wholly disappear until Dec., 1920. The *jus mariti* never extended to the wife's paraphernalia (i.e. her jewellery and clothing).

Jus Relictæ (Scots law), the right of a widow to a share of her deceased husband's moveable estate, namely, to one-third if he is survived by children, and otherwise to one-half. The right cannot be defeated by will, but may be excluded by antenuptial contract or satisfied by a testamentary provision accepted in lieu thereof. The corresponding right of a husband in his wife's estate is known as *jus relictii*. See *Legitim*.

Jusserand (zhús-rân), Jean Adrien Antoine Jules, French writer and diplomatist, born at Lyons in 1855. From 1887 to 1890 he was attached to the French Embassy in London, and in 1898 he was minister at Copenhagen. In 1902 he was appointed Ambassador to the United States. He has written several books, mainly connected with English history and literature, among them being *Les Anglais au moyen âge*; *La Vie nomade et les routes d'Angleterre au XIV^e siècle* (English translation, *Wayfaring Life in the Middle Ages*); *Le Roman au temps de Shakespeare* (1888 — translation, *The English Novel in the Time of Shakespeare*); *Histoire littéraire du peuple anglais (1594-1904 — translation, Literary History of the English People)*; *Shakespeare en France* (1898); *Honsard* (1913); and *With Americans of Past and Present Days* (1916).

Jussieu (zhús-yeu), a French family belonging

to Lyons, which has produced a number of distinguished botanists, of whom the following are the principal.—Antoine de, born 1686, died 1758.—Bernard de, brother of the above, born 1699, died 1777.—Antoine Laurent de, nephew of the above, born in 1748, died 1836. His work entitled *Genera Plantarum* formed the first complete exposition of the natural system of classifying plants, which has now taken the place of the artificial Linnæan system. His other chief work was *Principes de la méthode naturelle des végétaux*.—Adrien de, son of the preceding, born in 1797, died 1858. By his researches and publications he placed himself in the front rank of botanists. His best-known work was *Traité élémentaire de botanique*, for use in higher-class schools, which far excelled all previous works of the kind.

Jussieu, a genus of tropical aquatic or marsh-herbs, ord. Onagraceæ. Some species have special floating roots of spongy texture; these are very rich in intercellular spaces, and act as 'gills' for the ventilation of the parts embedded in the mud.

Justice, a common term for a judge or legal official appointed to hold courts and administer justice, especially given to judges of superior courts. Thus in England the judges in the common law and chancery divisions of the High Court of Justice are so called, the head of the common law division being the Lord Chief Justice of England. The term is similarly used in the British colonies and the United States. See *Chief Justice*, and articles below.

Justice, Lord Chief. See *Chief Justice*.

Justice-Clerk, Lord, in Scotland, the vice-president of the Court of Justiciary, and the presiding judge of that court in absence of the Lord President of the Court of Session. He is one of the Officers of State for Scotland, and one of the Commissioners for keeping the Scottish regalia. He is always one of the Senators of the College of Justice, and president of the second division of the Court of Session.

Justice-General, Lord, in Scotland, the highest judge in Scotland, also called the *Lord President of the Court of Session*. Formerly the office of Justice-General was a sinecure and not a judicial one; but the title, since 1831, has been associated with that of the Lord President.

Justice of the Peace, a judicial magistrate entrusted with the conservation of the peace. In Britain the first judicial proceedings are held before him in regard to arresting persons accused of grave offences; and his jurisdiction extends to trial and adjudication for small offences. In case of the commission of a crime or a breach of the peace a complaint is made to one of these magistrates. If he is satisfied with the evidence of a commission of some offence, he issues a

warrant directed to a constable, tries the party if the offence be within his jurisdiction, and acquits him or awards punishment. The justices meet in petty sessions or in quarter sessions, where they try offences of a minor sort, and they have certain other duties to perform, such as the licensing of places for the sale of intoxicating liquors—all duties being performed gratuitously. Justices are appointed by the Crown (through the Lord Chancellor, commonly on the recommendation of a Lord-Lieutenant or town council). In counties (till 1906) a person to be eligible must possess an estate of £100 per annum, or occupy a dwelling-house rated at £100. No such property qualification is now necessary. Borough justices must reside in or within 7 miles of the borough or occupy property in it. A mayor (or provost) is ex officio a justice. In Scotland the duties of a justice of the peace are more limited than in England, at least in practice. A property qualification is not necessary. In Canada and other colonies there are also justices of the peace, holding their commissions from the Crown. Since 1919, by the Sex Disqualification Removal Act, women, equally with men, are eligible for appointment as justices of the peace. In the United States the office is held by special appointment, usually for three or four years. The position is similar to that of the justices in Britain.—Cf. Pollock and Maitland, *History of English Law*.

Justices, Lords, in Great Britain, persons formerly appointed by the sovereign to act for a time as his substitute in the supreme government, either of the whole kingdom or of a part of it. Thus when George I went abroad in May, 1719, he entrusted the government during his absence to thirteen Lords Justices; and nineteen Lords Justices and guardians were also appointed when George IV went to Hanover in 1821.—The title *Lords Justices of Appeal* is in England given to a certain number of judges belonging to the appeal division of the Supreme Court of Judicature.

Justices in Eyre, or *Itinerant Justices*, in England, justices who travel about over fixed circuits dispensing justice, the judges of assize in fact. Such itinerant judges were first appointed in 1176; in Magna Charta they were required to visit each county annually. See *Assizes, Circuit*.

Justiciary Court, the supreme criminal court in Scotland, consisting of the Lord Justice-General (who is the president), the Lord Justice-Clerk, and other judges of the Court of Session. Besides sitting in Edinburgh, the judges go on circuit to three districts, viz. Jedburgh, Dumfries, and Ayr; Glasgow, Inverary, and Stirling; and Dundee, Perth, Aberdeen, and Inverness. Cases are tried by jury, one lord can hold a court, and there is no appeal.

Justification, a theological term employed to designate the act by which a person is accounted just or righteous in the sight of God, or placed in a state of salvation. This conception of God as a judge who absolves the sinner on account of Christ's merit and imputed righteousness is based upon the Pauline writings, and received its most pronounced expression at or immediately after the Reformation. The doctrine of justification was first clearly developed by Thomas Aquinas in the Scholastic period. Whilst the Catholic doctrine teaches that God *makes* man righteous, and imparts to him something of His own holiness, the Protestants emphasized justification 'by faith', maintaining that God does not make man righteous, but treats him as if he were righteous.—Cf. J. H. Newman, *Lectures on the Doctrine of Justification*.

Justification, in law, the plea that the statement complained of in an action of libel or slander is true. In criminal libels, to be a complete defence it must also be proved that the publication was for the public benefit. See *Criminality; Homicide*.

Justin, or **Justinus**, the name of two emperors of the East.—**Justin I**, born A.D. 450, died 527, a peasant of Dacia, rose from the ranks to be commander of the imperial guard, and on the death of Anastasius in 518 became emperor. He relegated the civil administration to the quaestor Proclus, and between them the empire was governed with a fair amount of success.—**Justin II** ascended the throne on the death of his uncle, Justinian I, in 565. Beset with enemies outside the empire and harassed by internal discord, he in 574 solved his difficulties by abdicating in favour of Tiberius, captain of the guard. He died in 578.

Justin (Marcus Junianus Justinus), a Latin historian, who probably lived at Rome in the second or third century after Christ, although some assign him a later date. He made an epitome of the general history of antiquity by Trogus Pompeius, a native of Gaul, who lived in the time of Augustus, and whose work is no longer extant. This epitome, although incorrect in detail, is valuable for its compressed reproduction of the old histories.

Justinian I, Flavius Petrus Sabbatius Justinianus, surnamed the *Great*, nephew of Justin I, Emperor of the East, celebrated as a lawgiver, was born of an obscure family in A.D. 483. Patronized by his uncle, who, from a Thracian peasant, had become emperor, he was made consul in 521, and, six years later, was adopted by Justin, and associated with him in the government, although he had made a somewhat scandalous marriage with an actress, named Theodora, who exercised a great influence over him.

He became emperor in 527, and died in 565. During his reign the party disputes of the *Greens* and the *Blues* became so violent that in his attempt to quell the tumults the emperor's own life was in jeopardy, and a great part of Constantinople was destroyed by fire. Aided by his generals, he was able subsequently to restore to the Roman Empire a part of its former possessions. Belisarius defeated the Persians, achieved victories in Africa, and captured Rome in 536, and re-took it in 546. Belisarius's successor, Narses, put an end to the Ostrogoth rule in Italy. Turning his attention to the laws, Justinian commissioned learned civilians to draw up a new code, and the result was the *Corpus Juris Civilis*, or *body of civil law*. He took great interest in building cities, fortifications, and churches; among the latter he rebuilt the church of St. Sophia at Constantinople. To maintain his public munificence he oppressed the people with taxes, and suffered his servants to commit the most flagrant crimes. His reign of thirty-eight years was a great period in the empire's history, but the emperor himself, though a man of tireless energy, was too vacillating to be really great.

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Justin Martyr, an early Christian writer, born in Palestine about A.D. 100, suffered for his faith about 165. Born a heathen but converted to Christianity, he went to Rome, where he wrote an *Apology for Christianity*, with a supplementary or second *Apology*, a *Dialogue with Trypho the Jew*, all still extant, besides other works. He is of importance in the history of Christian dogma.—Cf. Migne, *Patrologia*.

Jute, a textile fibre obtained from *Corchorus capsularis* and from *Corchorus olitorius*, plants belonging to the nat. ord. Tiliaceæ (lime or linden). The jute plants are natives of India, where their cultivation is carried on, especially in Bengal, on an extensive scale. The plants are annual ones, and grow to a height of 8 to 12 feet, and occasionally even higher. The fibre is embedded in the inner bark or fibrous layer of the plant, and possesses the tenacity common to the bark of the plants of this order. The fibre is not very fine, but is of fair lustre, and is used for the spinning of yarns from which the comparatively coarse fabrics used in bag- and sack-making are woven. Other uses are in the manufacture of coarse twine and wrapping paper. The manufacture of jute fabrics has been conducted in India for a considerable time, but the great spurt to the spinning and weaving of jute by power machinery followed the trials which were made in Dundee from 1880 to 1882 and onwards. These trials led

to great developments in Dundee, and in 1855 jute machinery was introduced into Calcutta. The trade in and around this city has gradually increased, and the machinery there now manufactures approximately half the total crop of jute fibre, or roughly from 4,000,000 to 5,000,000



Jute (*Corchorus capsularis*)

bales, the remaining 5,000,000 to 4,000,000 bales supplying the spinning and weaving machinery in the other jute manufacturing areas of Europe and America.

Jutland (Dan. *Jylland*), the peninsular and most important portion of Denmark, surrounded on three sides by the sea—the Skagerrak, the Kattegat, and the North Sea, and bounded on the south by Schleswig; area, 9808 sq. miles. A remarkable feature is the series of inland water-basins known as the Lilmfiord, extending from the North Sea to the Kattegat, and finding their chief outlet near Aalborg. The outlet towards the North Sea is sometimes sanded up altogether. The highest point of Jutland is the Himmelbjerg, 550 feet above sea-level. A great part of the peninsula is sandy and barren; in the south and east are some low alluvial tracts rich in verdure. There are many lakes and small rivers. The climate on the whole is temperate, but variable. The inhabitants are considered to be the most genuine specimens of the old Danish stock, and have preserved both the language and the manners and customs of early times in their greatest purity. Its earlier inhabitants, the Jutes, took part in the expedition of the Saxons to England. Pop. 1,253,800. See *Denmark*.

Jutland, Battle of. See *European War*.

Ju'venal (Decimus Junius Juvenalis), Roman

satirist, was born at Aquinum about A.D. 60, and died about A.D. 140. Few details of his life are known with absolute certainty, though there are several apocryphal Lives and a large amount of conjecture. The only facts about Juvenal that are almost certain are that he was at his prime at the end of the first century A.D.; that he sometimes, at any rate, lived at Aquinum (*Sat.* iii, 819); and that he is addressed by Martial in three epigrams (vii, 24 and 91; xii, 18). The most authentic Life tells us that Juvenal was the son or ward of a rich freedman; that he practised the art of declamation as an amateur until he was middle-aged; that his *Satires* were long unpublished; and that his lines on the actor Paris (vii, 90) offended a contemporary actor, who procured the banishment of the poet to Egypt, under colour of a military appointment.

It is probable, from passages in the *Satires*, that Juvenal belonged to the middle-classes, that he was of independent but not superabundant means. From the finished nature of his works it is likely that he spent a long time upon the composition of them. It is much less likely that Juvenal was ever exiled to Egypt; if this happened, it is more likely to have occurred under Domitian, before or after A.D. 93, when we know from Martial that Juvenal was at Rome.

An ancient inscription was discovered at Aquinum recording that a certain Junius Juvenalis, a commander of a Dalmatian cohort and provincial magistrate, dedicated an altar to Ceres. This has been taken by several scholars to refer to Juvenal, but, while it may well do so, it may equally well refer to some kinsman of the poet.

From Martial's epigrams we learn that there was a strong friendship between the poets, that Juvenal was eloquent, and that he wandered about Rome in the hot weather, and attended the levees of great men. It is probable, on negative evidence, that Juvenal was unmarried.

The works of Juvenal consist of sixteen satires (the last incomplete), which have been somewhat arbitrarily divided into five books: satires 1, 2, 3, 4, and 5 form the first book; 6 the second book; 7, 8, and 9 the third book; 10, 11, and 12 the fourth book, and the remainder the fifth book. The *Satires* fall naturally into two divisions, the second one beginning with satire 8. The difference between the earlier and the later satires is almost the same as the difference between the *Satires* and the *Epistles* of Horace. The later satires are much mellowed and much less denunciatory in their tone. The first satire is an introductory one, savagely denouncing the vices and follies of the age. The second satire, together with the ninth, is usually omitted from school editions, nor is the absence of these satires to be deplored on any ground save that of incompleteness. Juvenal's attitude towards vice

is that of the moralist, not, like that of Martial, that of a humourist, but he dwells upon unpleasant details and is revolting when he does so. The third satire is one of the greatest, the famous one on Rome, imitated most ably by Johnson in his *London*. Rome lives again in Juvenal's poem as vividly as in any other piece of Latin literature. The fourth satire displays the Emperor Domitian in a contemptible as well as an odious light, and tells the story of how a Cabinet meeting was summoned to settle the fate of a monster turbot. The fifth gives a picture of the vicissitudes of poor men at the tables of the wealthy. The sixth satire, *The Legend of Bad Women*, as it has been aptly called, is Juvenal's masterpiece, in spite of several obvious drawbacks. It is an attack on all sorts and conditions of women, and helps to explain the popularity of Juvenal in monasteries in the Middle Ages. It is thus the indirect cause of manuscripts of the *Satires* being both numerous and good. The seventh deals mainly with the difficulties of literary men at Rome. The eighth is a fine satire on the folly of boasting of a long pedigree, and is the source of the phrase " 'Tis only noble to be good ", culled thence by Tennyson. The tenth satire is well-known owing to Johnson's excellent adaptation of it, *The Vanity of Human Wishes*. The closing lines of this poem (containing the famous phrase "mens sana in corpore sano") are among the loftiest passages in Roman poetry. The eleventh is an invitation to dinner, preceded by some reflections on gourmands. The twelfth is an epistle to a friend who has just escaped from a shipwreck, together with some remarks on legacy-hunters. The thirteenth is an epistle to a friend who has been defrauded of some money. The fourteenth deals with the duties of parents and the vice of avarice. The fifteenth is a not very powerful satire, its subject being a case of cannibalism in Egypt. The sixteenth (incomplete) is a eulogy of the life of a soldier.

Juvenal is the greatest of all Roman satirists. He made satire a serious and dignified form of literature, in his own words "satire put on the high buskin" of tragedy. His chief qualities are his power of drawing realistic pictures, and his mastery of incisive phrases. Some of his masterly epigrams and phrases are as well known as any Latin quotations, even quotations from Horace and Virgil, though their Juvenalian origin is not always recognized. Such are

quis tulerit Gracchos de seditione querentes?

—a line peculiarly applicable to Irish politics—

nemo repente fuit turpissimus.

rara avis in terris, nigroque similima cyano.

quis custodiet ipsos custodes?

and

maxima debetur puero reverentia.

Juvenal's great literary gifts and his honesty of purpose as a moralist have made his fame secure, and, as well as his purely literary interest, he gives us more information about the life of his time than almost any other author.—BIBLIOGRAPHY (Editions): J. E. B. Mayor's monumental edition of thirteen satires is the standard edition. Less overwhelming are the editions by J. D. Duff and by E. G. Hardy. (Translations): There is a standard but unsatisfactory translation by Gifford, published in 1802. There is also one by A. Leeper, and a remarkably faithful one by A. E. Cole.

Juvenile Offenders. A juvenile offender is a young person apparently under sixteen years of age who has been apprehended. A child under seven years is not deemed capable of crime. In the Children Act, 1908, Part V, provisions have been made which have for their object the reclamation of the offender in preference to his punishment. Unless in the case of the committal by a juvenile offender of a grave crime such as homicide, or of the desirability of his removal from the influence of a criminal, or of his release being likely to defeat justice, and unless he can be brought before the court forthwith, he may be released on bail, and if detained, must be kept apart from adults under detention. On a remand or committal for trial, he must, whenever possible, be detained in a special place of detention and not in jail. The parent or guardian may be ordered to attend in court, and may be fined instead of the offender if he has been at fault in not exercising due care over him. Juvenile courts are to be held apart from the ordinary courts, and the public are not admitted except by leave of the presiding judge. Custody in a place of detention is a substitution for imprisonment, to which only a person between fourteen and sixteen years of age of an unruly or depraved character can be sentenced. On the further methods by which the court may deal with young offenders, see the article *First Offenders*.

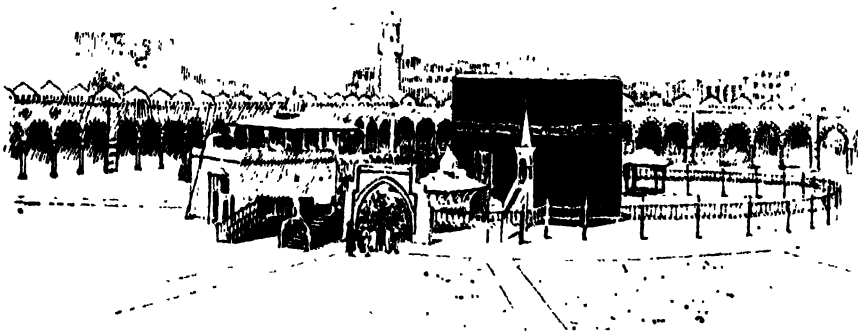
Juxon, William, English prelate, born 1582, died 1663. After studying at St. John's College, Oxford, he became a student of Gray's Inn, with the view of qualifying for the Bar, but took orders and obtained livings, first in 1609 at Oxford, and then in 1614 at Somerton. In 1621 he succeeded Laud as president of St. John's College; in 1627 was appointed vice-chancellor of the university, and about the same time chaplain-in-ordinary to Charles I, who gave him the deanery of Worcester, and then the bishopric of London (1633). He attended the king at his execution, and administered the last consolations of religion to him. His fidelity cost him his bishopric, but at the Restoration he was made Archbishop of Canterbury.

K

K, the eleventh letter of the English alphabet, representing a guttural articulation, the surd consonant corresponding to the sonant *g*. In Old-English this letter was only used occasionally, *c* being regularly used instead. So also in Latin, *k*, borrowed from the Greeks, was little used, its place being supplied by *c*. The Italians, Spaniards, and Portuguese have banished the letter entirely from their alphabet. The French use it only in a few words derived from the Greek, foreign proper names, &c.

Kaaba, the 'House of God' in the centre of the Harem (courtyard) of the Great Mosque at Mecca, to which all Mahomedans, no matter

which fell, with Adam, out of Paradise, whence it was returned during the flood (it is reputed to float on water), but was brought back again by Gabriel and given to Abraham, who set it where it now stands. In the year 278 of the Hegira the Karmathians carried it off, but restored it to the Kuraish some twenty years later. It is quite black and concave, and lies in a silver box some 20 inches square, set just high enough in the wall to be kissed readily. Originally the stone was of a milky-white colour, and its discoloration is popularly believed to be purely superficial, and due entirely to the sins of mankind or to the kissing of the multitude.



The Kaaba, Mecca.

where they may be, turn their faces at time of prayer, and which they also endeavour to visit at least once in a lifetime, there to perform the prescribed ceremony in accordance with the laws of the Prophet. All Mahomedans believe that the Kaaba was the first edifice ever erected for the worship of God, and that it is built upon holy ground where Adam, having been thrown out of Paradise, worshipped God in a tent provided by the Archangel Gabriel for that purpose. Seth, the son of Adam, afterwards built a clay house, which was rebuilt by Abraham, restored by the Kuraish (the chosen people) some years before the birth of Mahomet, and destroyed by storm about thirty-five years later. In 1627 a new building was erected, and this is supposed to have been destroyed and rebuilt upon at least a dozen different occasions up to the present time.

The building itself is square in shape, 14 yards long, 11 yards broad, and 16 yards high (outside measurements), and has a door of aloe wood which is plated over with solid silver and studded with silver nails. Inlaid at the eastern end of the southern wall is the famous *Black Stone*,

The Kaaba is only open at certain times, and particularly upon the 10th day of *Muharram*, when men only are admitted, women having the exclusive right of entry upon the following day. During the *Hajj* days it is draped in an *ihram* (see *Holy Carpet*), as are the pilgrims; and the *Tawaff*, or encompassing of the Kaaba, which must be done seven times by all pilgrims, commences from the sacred stone.

Kabul (kā-bul'), **Cabul**, or **Cabool**, capital of the Kingdom of Afghanistan, 165 miles from the Indian town of Peshawar, 600 miles from Herat, and 290 miles from Kandahar. It stands on the Kabul River, at an elevation of 6800 feet above sea-level, overlooked by hills and adjacent to fertile plains. It consists mainly of mud houses with flat roofs, but buildings of a superior class have been erected, including the palace of Abdur Rahman, to whom the city also owes a new bridge and other works, such as improved streets and new roads. The bazaar forms the chief street, being of great size. The Bala-Hissar, or citadel, is now of no importance. Kabul carries on a considerable trade with India through the Khyber Pass, and there is also a trade with

Central Asia, Persia, &c. It was taken by the British in 1839 and in 1842, and on the occasion of a subsequent war with the British in 1879 Kabul was twice taken by their troops. (See *Afghanistan*.) Pop. 75,000-90,000.—The Kabul River rises in Afghanistan, at the height of about 9400 feet, flows eastward, passes through the Khyber Pass into India, and falls into the Indus at Attock. Length, 300 miles.

Kadiak, or **Kodiak**, an island of Alaska, with large salmon canneries supplied almost entirely with fish from Karluk River. It has an extensive trade in furs from large bears found on the island. The inhabitants resemble the Eskimo in customs and mode of life, and the climate is damp and unwholesome.

Kämpfer (kämp'fēr), Engelbrecht, a German traveller and physician, born 1651, died 1716. As secretary to a Swedish embassy, and afterwards as surgeon in the service of the Dutch East India Company, he travelled extensively in the East. His comprehensive *History of Japan*, translated from his manuscripts into English in 1727, was, for a very long period, the only reliable source of information about that country.

Kaffa, or **Gomara**, an Abyssinian dependency, inhabited by one of the Galla tribes. It is supposed to be the home of the coffee-plant, which grows wild on the slopes of the Kaffa hills. The chief town is Bonga.

Kaffir-bread, the South African name of *Encephalartos*, a genus of Cycads, the interior of the trunk and of the ripe cones being used as food by the natives.

Kaffirs (from Ar. *Kafir*, infidel or unbeliever), the principal race inhabiting South-Eastern Africa, a branch of the great Bantu family. The name is now chiefly restricted to the tribes occupying the coast districts between Cape Province and Delagoa Bay. They differ from pure negroes in the shape of the head, it being more like that of Europeans; in the high nose, frizzled hair, and brown complexion, which becomes lighter in shade in the tribes of the more southern districts. They are a tall, muscular race, the average height being from 5 feet 9 inches to 5 feet 11 inches, and frugal and simple in their habits. Their chief occupation is raising and tending cattle, and hunting; garden and field work is mainly performed by women. They are of a peaceful disposition, but in times of war they displayed considerable bravery, tactical skill, and dexterity in the handling of their assegais or spears, shields, and knobkerries, as has been shown in their past engagements with the British forces. There are several distinct branches or families of Kaffirs; but the tribes which events have specially brought to the front are the Pondos, the Fingoes, the Zulus, and the

Swazi. Kaffirs, especially of the Zulu tribe, are distributed in large numbers over Natal and Cape Province, and have become to some extent civilized. Frequent hostilities have taken place between the British and one or other of the Kaffir tribes, beginning almost with the first acquisition by Britain of the Cape Colony. The first Kaffir War was in 1811-2, the next in 1818-9. In 1834-5 a serious Kaffir War was carried on, resulting in the expulsion of the Kaffirs beyond the Great Kei, but they were soon allowed to return. Another war (the fourth) broke out in 1846, and lasted nearly two years, with much suffering to both colonists and Kaffirs. Its result was an extension of territory in the north and east, a portion between the Cape Colony and the Kei being reserved for the natives, and called British Kaffraria. In 1850 a Kaffir outbreak took place, and a fierce war followed, ending in 1853, soon after which British Kaffraria was made a Crown colony. A sixth war occurred in 1877-8, owing its origin to disputes between the two tribes of the Fingoes and Gcalekas. See *Zuluand*. *BIBLIOGRAPHY*: H. H. Parr, *A Sketch of the Kaffir and Zulu Wars*; G. M. Theal, *History of South Africa before 1795*.

Kaffraria, literally the country of the Kaffirs, a name once applied to a large part of South-Eastern Africa, but now limited to the coast district between the Great Fish and the Kei Rivers. A tract of land south-west of the Kei used to be known as British Kaffraria, but in 1865 it was incorporated in Cape Colony as two districts, namely, King William's Town and East London. See *Kaffirs*.

Kafiristan, or the country of Kaffirs (infidels), an Eastern province of Afghanistan, between India and the Hindu Kush. It is very mountainous, especially the interior, and inhabited by a nation (the Shuposh) formed of different tribes, varying considerably in complexion. They live chiefly by cattle-raising and agriculture. Although hemmed in by Moslems, they have, excepting a few border tribes, resisted the spread of Islam. Their religion is a debased form of idolatry with an admixture of ancestor-worship and fire-worship. Polygamy is practised, and they dress themselves in goat-skins, or fabrics woven from goats' hair, black being the almost universal colour. Kafiristan was occupied by the Afghans in 1896.

Kaftan, or **Caftan**, a long loose vest or gown worn under a long cloth coat throughout the Levant. It is tied round the waist with a girdle. The sleeves are long, reaching well over the hands. Formerly the sultan and other potentates presented State dignitaries and foreign ambassadors with kaftans as special marks of honour.

Kagoshi'ma, a town of Japan, at the southern

end of the Island of Kyushu, on the Kagoshima Gulf. It was burnt in 1877 during the great Satsuma Rebellion, but rebuilt afterwards. Pop. 75,500.

Kaifeng, or **Khaifong**, a town in Central China, capital of the province of Honan, 9 miles from the right bank of the Hoang-ho. From 1280 to 1405 it was the capital of the Chinese Empire. Pop. 200,000.

Kailas (ki-läs'), a sacred mountain of the Hindus, on a spur of the Himálaya in Western Tibet, near the sources of the Indus and Sutlej. It is a place of pilgrimage for all Hindus and Tibetan Lamas or priests, who crawl on hands and knees round the base, some 28 miles in circumference, a proceeding which occupies three weeks. Height (approximately), 21,000 feet.

Kainite, a mineral hydrous chloride of potassium with magnesium sulphate. Potassium content, 15·7 per cent; calculated as potash, 18·0 per cent. It is found along with beds of rock-salt, especially in the Stassfurt area of North Germany. It is valuable in a crude state as a manure, and for the manufacture of potassium sulphate.

Kairwan (ktr-wan'), a town of Tunis, 80 miles S.S.E. of the capital, in a barren sandy plain, and surrounded by a brick wall with many towers and five gates. It ranks second only to Tunis in trade and population, and is one of the holy Mahomedan towns, being formerly almost inaccessible to Christians. Under French rule it has been connected with Tunis by a good road and also by railway with Sousse, and a water-supply has been introduced. Kairwan was the first seat of the Saracenic empire in Barbary, and relics of its ancient grandeur still abound. Pop. 20,000.

Kaisariah (ki-sur-ē'yā), or **Kaisariyeh** (ancient **Cæsarea**), a town of Asia Minor, at the foot of snow-capped Mount Argish (Argæus), (12,000 feet); surrounded by a dilapidated wall. Pop. 54,000. --- **Kaisariah** is also a village of Palestine, 32 miles north of Jaffa. It is the **Cæsarea** or **Kaisaria Sebaste** (13 B.C.) of the Romans, was the most important city of Palestine, was fortified by Louis IX (France) in 1251, and was destroyed by Beibars (1265). It was occupied by British troops during the European War, Sept., 1918.

Kaiser (Gr. *Kaisar*; Lat. *Cæsar*), the German equivalent for emperor. The title of 'Kaiser des heiligen römischen Reiches deutscher Nation' was borne by the German and Austrian Emperors from 962 to 1806, when Francis II, who since 1804 was already styling himself Kaiser of Austria, abandoned the former title. In 1871, after the Franco-Prussian War, King William I of Prussia assumed the title of Kaiser of Germany (*Deutscher Kaiser*), which remained in the House

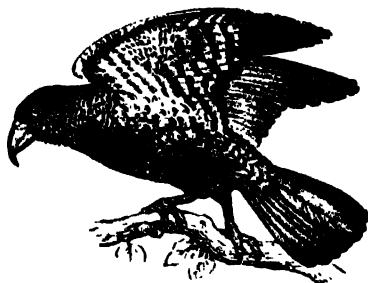
of Hohenzollern until the Revolution of 1918.—(Cf. Viscount Bryce, *The Holy Roman Empire*.)

Kaiserslautern (ki'zèr-lou-térn), a town in the Bavarian Palatinate, on the Lauter. It has manufactures of woollens, cottons, hosiery, stone-ware, sewing-machines, leather; breweries, paper-mills, and ironworks. In 1793 and 1794 fighting took place near Kaiserslautern between the Prussians and the French. Pop. 54,600.

Kaiser-Wilhelm Canal, now known as the Kiel Canal, a water-way connecting the Baltic with the North Sea. It was named in honour of the German Emperor William I.

Kaithal, an ancient town of India, Punjab, Karnal district; became British in 1843, and is connected by tradition with *Hanuman*, the monkey-god. The town has some local trade, and manufactures lac ornaments, toys, and salt-petre. Pop. 13,000.

Kaka (*Nestor meridionalis*), a New Zealand parrot, of a dusky colour, which feeds on fruits, insects, &c., and is semi-nocturnal in habits.



Kea (*Nestor notabilis*)

The kea, another bird of this genus (*N. notabilis*), attacks sheep, biting into their backs with its strong curved bill, and endeavouring to reach the kidney fat. Pecking at sheep-skins is believed to have originated this destructive habit.

Kak'odyle, or **Cacodyle**, a methyl derivative of arsenic, $As_2(CH_3)_4$. It is a clear liquid heavier than water, with an insupportably offensive smell and poisonous vapour. Its vapour when mixed with air explodes if heated above 50° C. See *Alkarsin*.

Kalafat', a town of Roumania, on the left bank of the Danube, about 1 mile east of Widdin, on the opposite bank. During the Russo-Turkish War of 1853-4 it was twice unsuccessfully attacked by the Russians. Pop. 12,000.

Kalahari, a desert region in South Africa, north of the Orange River, chiefly in Bechuanaland. It is very flat, subject to long-continued droughts, and has only dried-up river beds. But an abundant supply of water-melons and some remarkable varieties of tubers, together with large herds of antelopes and other game,

provide ample subsistence to the Bushmen and Bakalahari inhabiting this region. The Kalahari was first traversed by David Livingstone in 1849.

Kalahas'ti, a town of India, Madras Presidency, North Arcot district, with a temple of Śiva, which is a place of pilgrimage. Pop. 12,000.

Kalama'ta, a seaport of Greece, in the Morea, capital of the nomarchy of Messenia, at the head of the Gulf of Corone or Messenia. It is the seat of an archbishop, and has an export trade in wool, oil, silk, and figs. Pop. 15,397.

Kalamazoo', a town, county, and river of Michigan, United States. Kalamazoo city is situated in a fertile agricultural district, on the river of the same name, which supplies some of its numerous factories with water-power; chief manufactures: paper, flour, furniture, and agricultural implements. Settled in 1829, it became a city in 1884. Pop. (1920), 48,858.

Kalanchoe (-lank-), a genus of robust herbs or small shrubs, ord. Crassulaceæ, natives mainly of tropical Africa. Some are very handsome plants when in bloom, and several fine hybrids with pink or red flowers are in cultivation.

Kalbe (kāl'bè), a town of Prussia, 15 miles south of Magdeburg on the Saale. It has manufactures of woollens, paper, chicory, oil, and beet-root sugar. Pop. 12,088.

Kaleidoscope (ka-lī'-), a well-known optical toy invented by Sir David Brewster about 1816, by which an infinite variety of symmetrical, and often beautiful, coloured designs is obtained. The ordinary kaleidoscope consists of a tube containing two glass plates acting as mirrors, which extend along its whole length and make an angle of 60° with one another. One end of the tube is closed by a metal plate with a small hole at its centre, to which the eye is applied; at the other end there are two plates, one of ground, the other of clear glass (the latter being next the eye), with a number of pieces of coloured glass or beads lying loosely between them. When the eye is applied to the aperture, the mirrors produce a beautiful symmetrical figure, and when the tube is turned about or shaken, new images, always symmetrical, are formed. This arrangement may be modified in various ways. The instrument has been used by designers of patterns for printed calicoes.

Kalgan, a fortified town of China, province of Chi-li, on the overland trade route between Peking and Russia. There is a wireless telegraph station here. Pop. estimated at 70,000.

Kalgoorlie, a town of Western Australia, connected by railway with Perth and Coolgardie; head-quarters of a gold-mining district. Pop. 13,500.

Kali, a Hindu goddess, one of the forms of the consort of Siva, and therefore in some respects

corresponding to Durga and other deities. She is represented as black, with four arms, wearing a necklace of skulls, and the hands of slaughtered giants round her waist as a girdle. Her eyebrows and breast appear streaming with the blood of monsters she has slain and devoured. One hand holds a sword, another a human head. She is the goddess of death and destruction, and goats and other animals are sacrificed on her altars. Ancient Hindu books even enjoined human sacrifices to this goddess.

Kālidā'sa, one of the greatest Indian poets and dramatic writers, who lived, according to tradition, in the first century B.C., but some authorities assert that he flourished several centuries after the Christian era. His best production is the drama *Sākuntala* (The Fatal Ring), which was first translated into English by Sir W. Jones (Calcutta, 1789), and at once aroused in Europe attention to Sanskrit literature. He was also the author of two other plays: *Vikramorvaśī* (The Hero and the Nymph) and *Mālarikā and Agnimitrā* while two epics and other works are ascribed to him, some of which have been translated. Cf. A. A. Macdonell, *History of Sanskrit Literature*.

Kalinjar, a village and hill fort of India, United Provinces, Banda district, a place of great antiquity and sanctity, with tanks, caves, temples, tombs, and statues.

Kalisch (kāl'ish), or Kalisz, a town of Poland, near the Prussian frontier, capital of the former province of Kalisch. The town, occupied by the Germans in 1914, and used as a base for the attack on Lodz, is of great antiquity, being founded in A.D. 655, and was for a long period the residence of the Grand-Dukes of Poland, whose palace still exists. It is an important trade centre, and has various manufactures. Pop. 52,500.

Kal'mia, a beautiful North American genus of shrubs, with cup-shaped rose or purple flowers disposed in corymbs, and belonging to the nat. ord. Ericaceæ, or heaths. Its trunk sometimes attains a diameter of 3 inches; the wood is very hard, closely resembling box.

Kalmucks, a nomadic and warlike Mongol race, originally natives of the territory of Central Asia between the Koko-Nor and Tibet, now inhabiting not only parts of China, but also occupying districts of Siberia and European Russia, where they settled under Russian dominion on the Ural, Don, and Volga, and in the government of Simbirsk. They have been great warriors from very early times, fought many fierce battles with the Tartars, with the Chinese, and among themselves, and made predatory expeditions as far west as Asia Minor, and as early as the eleventh century. Many of the Russian Kalmucks have been converted to Christianity.

They are intrepid soldiers, splendid horsemen, and troops of them are attached to almost every Cossack regiment. Physically the Kalmucks are small of stature, broad-shouldered, with small round heads, and the narrow oblique eyes characteristic of the Mongolian race. Their language is a branch of the Mongol Ural Altaic family. They number altogether perhaps 700,000, of whom more than half are under Chinese rule.—Cf. Sir H. H. Howorth, *History of the Mongols*.

Kalocsa (ká'lot-shá), a town of Hungary, near the Danube; it has a Roman Catholic archbishopric, with fine cathedral and episcopal palace. Pop. 11,738.

Kalu'ga, a government and town of European Russia. The government is bounded by those of Moscow, Smolensk, Tula, and Orel, has an area, mostly flat and sandy, of 11,942 sq. miles, and a pop. of 1,407,200. The central parts are covered with immense pine and fir forests; the rest is poorly cultivated, producing chiefly grain, hemp, and flax. Iron ore and a poor kind of coal are also raised. The town stands on an elevation on the right bank of the Oka, a navigable river, 114 miles s.w. of Moscow, has rope and canvas factories, and trades largely with Germany in leather, oil, and candles. Pop. 50,900.

Kama (ká'ma), the Hindu god of love, corresponding generally to the Greek Eros and Roman



Kama or Kamadeva

Cupid. He appears as a beautiful youth riding on a parrot or a sparrow, the symbol of voluptuousness, generally carrying a bow with a string formed of bees, and having five arrows, each tipped with a flower that is supposed to have some amorous influence. Dancing girls or nymphs bear him company, and one carries his banner, the emblem on which is a fish or marine monster on a red ground. Once he tempted Siva to sin, and the enraged god reduced the tempter to ashes by a gleam from his third eye.

He is therefore known as the bodiless god. His wife is Rati, or Pleasure.—Cf. Donald A. Mackenzie, *Hindu Myth and Legend*.

Karna, the largest tributary of the Volga, rises in the Russian government of Viatka, and after a course of 1150 miles flows into the Volga, 40 miles south of Kasan. Part of it is navigable for steamers, and ordinary barges can proceed as far as Perin.

Karn'ala, a drug long known, under various names, to Indian and Arab physicians as a specific against tape-worms; introduced into the *British Pharmacopoeia* in 1864, but now superseded by other anthelmintics.

Kamchatka, or **Kamtshatka**, a large peninsula in North-Eastern Siberia belonging to Russia, by whom it was first colonized at the end of the seventeenth century. On the east it has the North Pacific Ocean, and on the west the Sea of Okhotsk; area, 104,200 sq. miles. Lofty mountain ranges extend the entire length of the peninsula, and have many active volcanoes. A number of hot springs also exists. The climate is very severe. Excepting in the valley of the Kamchatka River, the most fertile and populous settlement, the soil is but ill adapted for cultivation. The chief wealth of the country lies in its fur-producing animals, including the sable, the Arctic fox, the beaver, and the bear. Game and fish of all kinds abound, and form the staple food of the inhabitants. The Kamchadales, once the predominant race of the peninsula, are a branch of the Mongol family, a low type physically and morally, and their food consists mainly of fish seasoned with whale and seal fat. They believe in a creator and the immortality of the soul (including animals). They use dogs for draught purposes, and not the reindeer, like their neighbours. The Koryaks are a wandering tribe, living in the northern districts, and subsisting almost exclusively on the produce of the reindeer. The entire population is about 11,500.

Kamenetz', a fortified town of Russia, capital of the government of Podolsk, on the Smotritz. Pop. 49,000.

Kamenz (ká'ments), a town of Germany, in Saxony, the birth-place of Lessing (born in 1729), with industries connected with wool, glass, &c. Pop. 11,200.

Karnes, a name given to long winding banks and ridges of gravel and sand in Scotland and elsewhere, formed by outwash from the fronts of retreating glaciers of the Ice Age.

Kampen, a town of Holland, on the Yssel, near where it enters the Zuider Zee. It has two interesting churches and a town hall. It was one of the towns belonging to the Hanseatic League, and has a good trade in dairy produce. Pop. 19,745.

Kamptee (kām-tē), or **Kamthi**, a town of India, Central Provinces, Nagpur district, with a fine bridge over the Kanhan River, and a Protestant and a Roman Catholic church. Pop. 17,200.

Kamrup (kām-rōp'), a district of Assam, in the Brahmaputra valley; area, 3857 sq. miles. Pop. 668,000.

Kam'yshin, a town of European Russia, at the juncture of the Kamyshinka and the Volga, in the government of Saratov. It was founded by Peter the Great in 1710. Pop. 17,410.

Kanagawa, in the suburbs of Yokohama, Japan, was formerly an important Japanese seaport, and the first to be opened as a treaty-



Kangaroo (*Macropus giganteus*)

port, for the free entrance of foreigners, in 1859. At this time Kanagawa was a town of considerable size, and Yokohama merely a tiny fishing-village; but by some decision of the Japanese Government, Yokohama was made the treaty-port instead of Kanagawa, and subsequently grew so rapidly that Kanagawa merged with it as a suburb.

Kana'ka, a Polynesian word originally used to describe the native inhabitants of the Sandwich Islands, but now applied indiscriminately to all South Sea Islanders of Polynesian-Melanesian extraction.

Kanaza'wa, a town of Japan, near the north-west coast of the main island, and north-west of Tokio, with manufactures of silks and porcelain. Pop. 111,000.

Kandahar, or **Candahar**, a town of considerable commercial and strategical importance in the south of Afghanistan, on the direct route to India. It was held by British forces in 1839-42, and 1879-81. The town lies 3484 feet above the sea, and has a large transit trade. Pop. 31,500.

Kanda'vu, the southernmost island of the Fiji group. It has a fine natural harbour, with

a port of call for steamers, and is surrounded by a number of small islands, called the Kandavu group. The area is 209 sq. miles, and the pop. 15,000.

Kangaroo, the common name of a number of animals belonging to the marsupial order of mammals, indigenous to Australia and some of the islands to the north of that continent, and first made known to Europe by Bruyn in 1711, and afterwards by the writings of Captain Cook and Sir Joseph Banks. The most noticeable feature about the kangaroo is the disproportion between the upper and lower parts of the body. The head is small, deer-like in shape, with large ears; the fore-legs small and five-toed; the hind-legs very large and powerful, with four toes only on the feet. The tail is long, thick at the base, and helps to support the animal when sitting erect, the usual posture when not feeding; it also assists the hind-legs in their long leaps (from 10 to 15 feet). The young are born very immature, and protected and nourished for about eight months in the *marsupium*, or pouch, into which the nipples of the mammary glands open. Kangaroos are herbivorous, and, where still plentiful, a serious pest to squatters, whose rifles have, however, considerably reduced their number. The hind-quarters of the large species supply a tolerable substitute for venison, while

their tails make excellent soup, and their skins good rugs and leather. The kangaroo includes many species, varying in size from a hare to a large sheep, and

remains of still larger and extinct species have been found in the Pleistocene deposits of Australia. The larger and most common kinds belong to the genus *Macropus*, and include the giant kangaroo (*M. giganteus*) and the still larger red kangaroo (*M. rufus*). Wallabies are smaller forms, some being species of *Macropus*, while most belong to other genera. The tree kangaroos (*Dendrolagus*) are native to New Guinea and North Australia.

Kangaroo Island, a long and barren island (area, 1071 sq. miles) situated at the entrance to the St. Vincent Gulf, South Australia, 103 miles from Adelaide. The first party of South Australian emigrants landed here in 1836.

Kangaroo Rat (species of *Potorous*, *Bettonia*, and *Uropygimus*), more properly rat-kangaroo, diminutive species of the kangaroo family, differing from the kangaroo proper in possessing canine teeth in the upper jaw, in their nocturnal habits, and their food, which chiefly consists of roots.

Kangra, a large district of Hindustan, in the Punjab, belonging mainly to the Himalayan chain; area, 9978 sq. miles. About a ninth is

under cultivation, and large tracts are covered with forests. Pop. 770,000.—The town of *Kangra*, formerly known as Nagarkot, had a temple which was destroyed by an earthquake in 1905. Pop. 5000.

Kanizsa (kán'i-shù), a market town of Hungary, district of Zala, with large distilleries, and fairs for grain, cattle, and pigs. This town is called Nagy-Kanizsa, and is to be distinguished from Magyar-Kanizsa and Török-Kanizsa, both now belonging to Yugo-Slavia. Pop. 26,000.

Kano, a city of West Africa, Northern Nigeria, capital of the province of Kano and native town of the Hausa people, was annexed by the British in 1903. It is the seat of an Ameer, who governs under British protection and authority. The Ameer's palace covers over 33 acres. The town is walled, and is an important trading centre for ground-nut and hides, and the silk, leather, and cotton manufactured by the natives. Pop. (of mixed nationalities), about 100,000.

Kanoje (ka-nōj'), or **Kanauj**, a town of India, United Provinces, on a plain near the Ganges. It was once the capital of a great empire, but now consists chiefly of ruins which extend over several miles, though there is also a modern town with some manufactures. Pop. 17,500.

Kan'sas, one of the United States, bounded north by Nebraska, east by Missouri, south by Oklahoma and Indian Territory, west by Colorado; area, 82,158 sq. miles. It consists chiefly of undulating plains, well watered by the Kansas and Arkansas and other rivers, the Missouri forming the boundary on the north-east. The soil is generally fertile, highly suitable for grain, vegetables, and fruit, and cattle-raising is carried on very extensively. The climate is mild, and the winter short, but violent winds and sudden changes of temperature often mar the spring season. Although an agricultural state, Kansas has important and varied manufactures, the rivers supplying the motive power in many places. Bituminous coal, iron ore, lime, marble, lead, and salt are among the minerals, and coal is mined to a considerable extent. Education is well provided for, and there is a state university, an agricultural college, and other colleges and normal schools. It had over 12,000 miles of railroad in 1921. The chief towns are Leavenworth, Lawrence, Topeka, and Atchison; Topeka being the state capital. Kansas originally belonged to the Louisiana territory. Settlers had entered it in considerable numbers by 1853, and in 1860 it was admitted one of the states of the Union. Pop. (1920), 1,760,257.

Kansas City, a town of Kansas, United States, county seat of Wyandotte county, on the Kansas and Missouri Rivers, in the midst of a rich agricultural region, and forming a centre in which

numerous railroads meet, thus making it a great commercial emporium. As a live-stock market it is probably the first in the United States, and it is a great beef- and pork-packing centre, its grain trade also being large. Its manufactures are of importance. It has a university, Kansas City University (founded in 1896). Pop. (1920), 101,177.

Kansas City, a city and port of Missouri, United States, in Jackson county. Three railroad bridges span the Missouri River, and the city is an important railway junction. Its trade in live stock and grain is considerable, and its manufactures include agricultural implements and clothing. Among its public buildings are the custom-house, the Board of Trade building, the live-stock exchange, and the Convention Hall. Pop. (1920), 324,410.

Kansoo', or **Kansu**, an inland province of North-Western China; area, 125,450 sq. miles. It is mountainous, some of the peaks rising more than 10,000 feet above sea-level, and is watered by the Yellow River (Hoang-ho), but has few fertile tracts. The climate is cold, but wheat, barley, and millet grow, and large flocks and herds are maintained. Lan-choo-foo is the capital. Pop. (estimated), 6,810,000.

Kant, Immanuel, a celebrated German philosopher, the founder of the 'critical' or Kantian philosophy, born on 22nd April, 1724, at Königsberg, Prussia, died at the same place 1804. Kant himself believed that his grandfather was a Scottish immigrant, the original form of whose name was Cant. There is, however, no documentary evidence to prove this. He early showed great application to study, and was sent to the Collegium Fredericianum, and then (in 1740) to the university of his native city. His progress at college and at the university was rapid and brilliant, his studies embracing in particular mathematics and physics, as well as philosophy. Leaving the university after three years, he engaged in tuition, and it was not till 1755 that he took his degree. Soon after this he was appointed one of the teachers in the Königsberg University, and lectured on logic, metaphysics, mathematics, and natural philosophy, to which, at subsequent periods, he added natural law, moral philosophy, natural theology, and physical geography. In 1770 he became a full professor, obtaining the chair of logic and metaphysics, a post that he occupied till 1797. It is impossible within our space to give anything like an exposition of the philosophy of Kant, which has profoundly influenced all subsequent philosophical speculations. Whilst in his earlier works we notice the influence of Leibnitz and Wolff, Kant afterwards came under the sway of English empiricism. Dissatisfied, however, with the dogmatism of

Wolff and the scepticism of Hume, with the doctrines both of idealism and realism, which considered either mind or matter as the absolute, Kant, beginning to suspect all forms of metaphysical theory, set himself to investigate the field of metaphysics for himself, and in the first place proceeded to the examination of the origin, extent, and limits of human knowledge. According to him, part of our knowledge is knowledge a priori, or original, transcendental, and independent of experience; part of it is a posteriori, or based on experience. What he calls the 'pure reason' has to do with the former. His great work named the *Kritik der reinen Vernunft* (Critique of Pure Reason; first edition, Riga, 1781) contains the foundation for his whole system of philosophy. In the preface to a later work, the *Kritik der Urtheilskraft* (Critique of the Power of Judgment; Berlin, 1790), he defines pure reason thus: "Pure reason is the faculty to understand by a priori principles; and the discussion of the possibility of these principles, and the delimitation of this faculty, constitutes the critique of pure reason. In the first rank of such ideas as we do not derive from experience are *space* and *time*." Kant shows that all our perceptions are submitted to these two forms, hence he concludes that they are within us, and not in the objects; they are necessary and pure intuitions of the internal sense. The three original faculties, through the medium of which we acquire knowledge, are *sense*, *understanding*, and *reason*. Sense, a passive and receptive faculty, has, as already stated, for its forms or conditions *space* and *time*. Understanding is an active or spontaneous faculty, and consists in the power of forming conceptions according to such categories as unity, plurality, causality, &c., which categories are applied to objects of experience through the medium of the two forms of perception, *space* and *time*. Reason is the third or highest degree of mental spontaneity, and consists in the power of forming ideas. As it is the province of the understanding to form the intuitions of sense into conceptions, so it is the business of reason to form conceptions into ideas. Far from rejecting experience, Kant considers the work of all our life but the action of our innate faculties on the conceptions which come to us from without. He proceeds in a similar way with morality: the idea of good and bad is a necessary condition, an original basis of morals, which is supposed in every one of our moral reflections, and not obtained by experience. He treats this part of his philosophy in his *Kritik der praktischen Vernunft* (Critique of Practical Reason; 1788).—

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Kanu'ri, or Kano'ri, a Sudanese people, who form the principal portion of the population of Bornou.

Ka'olin, a name derived from a locality where the Chinese work a pure white clay used in the manufacture of porcelain. Kaolin is the result of the decomposition of granitic rock, containing felspar, mica, and quartz. Similar clays, differing slightly in colour and in the percentage of constituents, are found at Schneeberg, in Saxony, furnishing the material of Dresden china; at Limoges, in France, employed for Limoges ware; and at St. Austell, in Cornwall, the source of supply for the British potteries. In its natural state kaolin-earth somewhat resembles mortar; by washing and repeated filtration it is freed from quartz and other coarse ingredients, then dried and sent into the market cut into blocks. The fine separated material consists of the mineral kaolin or kaolinite, which is the basis of all clays. It is a hydrous aluminium silicate, $H_4Al_2Si_2O_9$, arising from the decay of alkali felspars, and occasionally crystallizing in minute six-sided plates.

Kapurthala (ka-pōrt'ha-la), a native state of the Punjab, India, between the Beas and the Sutlej Rivers; area, 630 sq. miles; pop. 208,133. —The capital, *Kapurthala*, lies 65 miles east of Lahore, and 8 miles from the left bank of the Beas. Pop. 18,500.

Ka'raites, a Jewish sect, founded during the latter half of the eighth century by Anan Ben David, and which was for a long time the object of persecution by the orthodox Jews. They were originally known as Ananites, from the name of their founder, but in the ninth century the designation Karaites (Heb. *Karaim*) was applied to them. They refuse to accept as divine or authoritative the traditions and doctrines of the *Talmud*, or those in the rabbinical writings, and adhere closely to the text and letter of the Old Testament. The sect never became very important, although thinly spread over many Eastern countries. They are still found in Poland, Galicia, Alexandria, Cairo, Constantinople, Jerusalem, and Hit on the Euphrates; but their chief stronghold is in the Crimea, where about 12,000 or 13,000 of them are said to exist.

Karako'rum, or Mustagh, a mountain range in the north-west of the Himalaya, parallel to the main range, from which it is separated by the Upper Indus valley. It contains Godwin-Austen, or K₁ (28,278 feet), the second highest of the Himalaya. There is also a pass in this range, 18,000 feet above sea-level, on the direct route from India to Eastern Turkestan.

Kar'aman, a town of Asia Minor, chief town

of Karamania, on the Bagdad Railway. It is the ancient *Laranda*. Pop. 7500.

Karaman'ia, or **Caramania**, a region of Asia Minor. It is traversed from east to west by the Taurus range, covered with oak and pine forests, and watered by the Kizil-Irmak, the Syhoun, and other lesser rivers. The climate is genial, the soil rich, producing abundant harvests, and the vine and the fig grow in profusion. The chief occupation of the inhabitants, mostly Turkish, is the rearing of live stock. The capital is *Konieh*.

Kara Sea, a part of the Arctic Ocean, between *Novaya Zemlya* in the north-west and the *Yamal Peninsula* of Siberia in the south-west. It has sometimes been used as a trade route for ships from Western Europe to Siberia.

Karategin (*kä-rä-tä-gēn'*), a khanate of Central Asia, subject to Bokhara, situated in the valley of the *Surkhah*. Fruit and corn are grown, but in winter the cold is intense. Pop. about 100,000.

Karauli', a town of India, in *Rājputāna*, capital of native state of the same name, surrounded by walls and a moat, and containing a palace and handsome temples. Pop. 20,000.—The state, which is under the superintendence of the *Bhurtore* and *Karauli Agency*, has an area of 1242 sq. miles, and a pop. of 146,587.

Karēns, a pagan tribe of *Burmah*, formerly confined to a region beyond the *Salween River*, called *Karen-ni*, on the borders of *Burmah* and *Siam*, but now distributed over various parts of *Burmah*. They are an intelligent and industrious race, many of them having become Christianized through the agency of American missionaries. They are estimated at about 1,100,000.

Karikāl', or **Carikal**, a small French settlement in India, in the *Carnatic*, on the *Coromandel coast*, 150 miles s. of *Madras*. Area, 53 sq. miles; pop. 57,000.—*Karikāl*, the capital, on the *Cavery delta*, has a pop. of 18,038, and a large export trade, chiefly in rice.

Karli', a celebrated Buddhist cave-temple of India, *Poonah district* of *Bombay Presidency*. It is rich in sculpture, and is divided like a church into nave and aisles, with an apse.

Karma'thians, once a powerful *Mahomedan* sect, founded in *Irak* by *Hamdan Karmat* during the ninth century, who adopted the doctrines of the *Ismailis*, and introduced communism among his rapidly increasing flock. Missionaries were trained to spread his creed, and one of them, *Abu Saïd*, gained a strong hold on the people of the *Persian Gulf*. The caliph, afraid of the influence of the new sect, sent an army for its suppression, but he was defeated, and *Abu Saïd* took possession of the whole country. His son *Abu-Tahir*, who succeeded him, made, further

conquests, and became master of almost all *Arabia*, *Syria*, and *Irak*; but under his successors this power rapidly declined, and was finally broken towards the end of the tenth century.

Karnak, a village of Upper Egypt, forming, with *Luxor*, the site of the ancient city of *Thebes*. It contains the remains of a Great Temple founded by *Usertesen I.*, and built of limestone and sandstone, with granite doorways. Other Egyptian monarchs added to the structure, and the Pharaohs spent nearly a century in the erection of a tremendous hypostyle hall. An earthquake in 27 a.c. destroyed part of the temple. Hatshepsut's obelisk, the loftiest discovered, stands here. It was about 189 feet in height, and is stated, by the hieroglyphics that adorn it, to have been quarried, shaped, and erected in seven months. There is also an avenue of ram-headed sphinxes and many other archaeological remains. See *Thebes*.

Karnal (*kar-nāl'*), an Indian town and district, in the *Punjab*; area of district, 3153 sq. miles; pop. 800,000.—*Karnal*, the head-quarters of the district, trades largely with *Delhi* and *Umballa*. Pop. 22,000.

Karnul', or **Karnool'**, a town of India, in the *Presidency of Madras*, situated in the fork formed by the junction of the *Hundri* with the *Tungabhadra*, with a dismantled fort. Pop. 25,376.—The district has an area of 7514 sq. miles; a pop. of 872,423.

Karroos, the name given in *South Africa* to the elevated tablelands, 3000 to 4000 feet above sea-level, lying between the mountain ranges. The soil is shallow but rich, and during the rainy season, or when artificially watered, vegetation is most profuse. The *Karroos* form excellent pasturage for cattle, sheep, and *Angora goats*; and great tracts are now occupied as farms, the uncertain rainfall being supplemented by permanent springs and large reservoirs. The 'Great Karroo', in *Cape Province*, extends from east to west for 300 miles, with a breadth of 70 miles.

Kars, a town in, and capital of, the province of *Kars*, in *Transcaucasia*, in the former Russian government of the *Caucasus*. It was formerly a Turkish fortress, and the scene of several gallant defences. Captured and annexed by the Russians in Nov., 1878, it became the capital of a Russian province of the same name. Connected with *Batoum* and *Tiflis* by military roads, the fortifications were much enlarged and strengthened. During the *European War* *Kars* was captured by the Turks in April, 1918. Pop. 27,500. See *Transcaucasia*.

Karshi, a town of *Bokhara*, and a meeting-point of several trade routes; produces a superior quality of tobacco from plantations in the vicinity, and was once the favourite residence of *Tamerlane*. Pop. 25,000.

Kartike'ya, the Hindu god of war. He is represented riding on a peacock, with six heads and twelve hands, in which numerous weapons are brandished.

Karun', a navigable river of South-Western Persia, falling into the Shatt-el-Arab, or joint stream of the Euphrates and Tigris. Steamers can go up it as far as Ahwaz.

Karwar', a seaport of India, Bombay Presidency, with a safe harbour and a good trade. Pop. 18,000.

Kasganj', a town of India, United Provinces; well built, with a good trade in grain and sugar. Pop. 20,000.

Kashan', a town of Persia, province of Kashan, in a fertile plain 90 miles south of Isfahan. It is regularly built, has many fine mosques, &c., and its silks, carpets, and jewellery are much esteemed. Pop. 30,000.

Kashgar', a city of Chinese Turkestan, on the Kizil-Su, tributary of the River Tarim, which divides it into two parts, one called the 'old' and the other the 'new'. The ruins of ancient Kashgar, once an immense walled city, lie near here. Kashgar is of some commercial importance. A wireless station was erected in 1919. Pop. 30,000.

Kashkar, or **Pamir Sheep** (*Ovis poli*), a large species of sheep inhabiting the lofty plateaus of Central Asia. The male has very large horns bent circularly, while the female has horns resembling those of a goat.

Kashmir, an extensive principality in North-West India, subject to a ruler (the Maharajah) belonging to the Sikh race. The principality embraces not only Kashmir proper, but also Jamoo or Jummoo, Baltistan (Little Tibet), Ladakh, Gilgit, &c. The area is estimated at 84,432 sq. miles. It extends from about 32° to 37° N. lat., and from about 73° to 80° E. long., and is largely a region of mountains, containing magnificent glaciers. The Kuenlun range bounds it on the north, one peak of which rises to the height of 28,263 feet. The country is watered by the Upper Indus and its tributaries, and by the Jhelum and Chenab. Kashmir proper, which forms a small portion of the whole, is a valley surrounded by gigantic mountains, the Himálaya and Hindu Kush, and traversed by the River Jhelum (formerly Hydaspes). There are ten chief passes through the mountains into this valley, varying in height from about 9000 to 12,000 feet. The elevated situation of the valley, and the mountains of snow which surround it, render the climate rather cold; but the region is well watered by streams and very fertile. Forests on the slopes, fields of corn, rice crops along the sides of the rivers, rich orchards, and an abundant growth of flowers distinguish the district, but the fruits of warm

climates do not ripen here. Among its minerals are iron and plumbago. Sulphur springs are common. Earthquakes frequently occur, and in 1883 one caused the loss of thousands of lives. Bears, leopards, wolves, the ibex, and chamois are among the animals. The flora has a strong affinity to that of Europe; the deodar cedar forms extensive and valuable forests. The common European fruits are grown, and attention is now being paid to the culture of the vine. The chief crops are wheat, barley, rice, and Indian corn, and two harvests are reaped in the year. The chief manufacture was that of the celebrated Kashmir shawls, but it is not so extensive as it once was, since the establishment of manufactures at Amritsar in the Punjab, and elsewhere. The genuine Kashmir shawls owe their superiority to the material of which they are made, which is, properly speaking, not wool, but a fine kind of down with which the animals of this region are clad during the winter season, and which in length and fineness far surpasses the merino wool. This down is obtained in great quantities from the Kashmir goat, the yak of Tibet, and the wild sheep. It is spun by women and girls, and then passes into the hands of the dyers. From the dyers the yarns are passed to the weaver, and the shawl is woven in stripes, which are afterwards very skillfully sewed together. The average time taken to manufacture a good Kashmir shawl is from sixteen to twenty weeks. The Kashmir shawl dates back to the days of the Emperor Baber. The inhabitants of Kashmir are a fine race physically, tall, strong, and well-built, with regular features. There are thirteen separate dialects in use. The Maharajah is independent, but his relations with other states are subject to the authority of the Government of India. The capital of the whole principality is Srinagar (or Kashmir), which is the Maharajah's usual residence and the largest town. The total revenue is estimated at £900,000, chiefly from land. The Government revenue is paid in kind, and the grain claimed by the State is stored in public granaries and sold at fixed prices. The population in 1911 was 3,158,126, the majority of which are Mohammedans, although the ruling family is Hindu.

Kashmir Goat, a variety of the common goat remarkable for its fine downy fleece, said to be found in perfection only in Tibet in the neighbourhood of Lhasa, but also found in other parts of this region, including Ladakh, now a province of Kashmir. The colder the region where the goat pastures, the heavier is its fleece. A full-grown goat yields not more than 8 ounces, the fine curled wool being close to the skin. A large shawl of the finest quality requires 5 lb. of the wool; one of the inferior quality from 3 to 4 lb.

Kas'sala, a town of the Sudan, near the frontier of Eritrea, occupied for a time by the Italians but ceded to the Anglo-Egyptian authorities; is of some importance as a military station. Pop. 10,000.

Kassimov', a town of Russia, in the government of Riazan, on the Oka. It has a large trade, carries on tanning, and manufactures boots and shoes. Pop. 14,000.

Kastamu'ni, the ancient **Germanopolis**, a town of Asia Minor, capital of the Turkish vilayet of Kastamuni (ancient *Paphlagonia*). It abounds in mosques and public baths (25), but has no trade, although there are copper-mines in the vicinity. Pop. estimated at 20,000.

Kasur', a town of India, Lahore district, Punjab, with manufactures of leather and a good trade. Pop. 24,800.

Kat'rine, Loch, a picturesque and much-frequented lake, Scotland, county of Perth, 5 miles east of Loch Lomond; 10 miles long, in some places 2 miles broad, and encircled by lofty mountains and rocky ravines clothed with trees. At its east end is the celebrated pass of the *Trossachs*, rendered famous by Scott's *Lady of the Lake*. Through this pass a stream flows, carrying the surplus waters of the lake to Loch Achnay. The water-supply of the city of Glasgow is drawn chiefly from Loch Katrine.

Kattywar, or **Kathlāwār** (kāt-hi-ā-wār'), a peninsula of Hindustan, Bombay Presidency, between the Gulf of Cambay and the Rann of Cutch. Most of it is occupied by the Kattywar Agency, formed by numerous small native states of Gujrat, many of which are tributaries to the British Government, to the Gaekwar of Baroda, or to the Nawab of Junagārh. The surface is generally undulating, the soil sandy, and only productive where irrigated. Cotton is the principal crop. Area, 20,911 sq. miles; pop. 2,440,057.

Ka'tydid (*Cyrtophyllus concavus*), several species of grasshopper of a pale-green colour, body about an inch long, found in some parts of North America, and so named from the love-call made by the males. This is produced by the friction of a sort of file at the base of the right wing-cover, which is scraped by the sharp edge of the left wing-cover. It can be heard on a quiet night a quarter of a mile away. The females respond by a single chirp.

Kauffmann, Marie Angelica, a distinguished painter, born at Coire, Switzerland, 30th Oct., 1741, died at Rome 5th Nov., 1807. She received her early instruction from her father, himself a painter, and before the age of twenty she had become famous. After a study of the Italian masters, and while at Venice, she was induced to go to London (in 1765), and became one of the thirty-six foundation members of the Royal Academy (1768). She is at her best in

ideal figures: her faces are tender and elevating, her grouping and draping excellent, but her design often lacks energy and firmness, while her colouring (the latest paintings excepted) is rather too brilliant. Among the pictures which she painted in England are: *The Mother of the Gracchi*, *The Sacrifice of Messalina*, and *Cupid and Psyche*. Among her best portraits are that of herself in the National Gallery, and Raphael Mengs and Lady Hamilton in the South Kensington Museum.—**BIBLIOGRAPHY:** G. de Rossi, *Vita di Angelica Kauffmann*; F. A. Gerard, *Angelica Kauffmann*.

Kaulbach (koul'bakh), Wilhelm von, German historical painter, born at Arolsen, Waldeck, in 1805, died at Munich of cholera in 1874. He studied at the art academy of Düsseldorf under Cornelius, whom he assisted in the execution of the frescoes of the Glyptothek or gallery at Munich, and subsequently succeeded as director of the Munich Academy. His most ambitious pictures, with the exception of the *Madhouse* (1828), are to be found in a series painted between 1834 and 1863, and utilized in the decoration of the Berlin Museum, which depicts the progress of the human race in typical scenes from the great historic periods, and comprising the *Tower of Babel*, *Age of Homer*, *Destruction of Jerusalem*, *Battle of the Huns and Romans*, *The Crusades*, and *The Reformation*. He also produced a large number of portraits, designs, and illustrations of books, including the *Reineke Fuchs*, the Gospels, and the works of Shakespeare, Goethe, and Schiller. As a colourist he was of inferior rank, his main strength lying in draughtmanship and composition. In choice and handling of themes his range was great, and he deserves credit for the part he played in the revival of mural decoration. But the value of his work is often lessened by a straining after symbolism and allegory. He marks a transition from the idealism of Cornelius to the realism of more modern painters.—Cf. F. von Ostini, *Wilhelm von Kaulbach* (in *Kunstler Monographien*).

Kauri Pine (*Agathis australis*), a tree peculiar to New Zealand, and found there only at the northern extremity of the North Island. It reaches the height of 150 feet, and its timber is much valued for building purposes and for making furniture. The resin of this tree, the kauri gum, forms a valuable export, and is used in making fine varnish, &c. Most of it is obtained in a fossil state, by digging.

Kazan', a town of European Russia, with a university, and a cathedral contained within a kremlin or citadel of some historic interest. This is the Kazan of the opera *Boris Godounov*, and is the capital of the district having the same name. There are some manufactures, but the town is more renowned as a seat of Oriental learning. Pop. 195,000.

Kaz'vin, a town of Persia, in the province of the same name, forming an extensive plateau some 4000 feet high. The town forms a junction for the trade routes to Teheran out of Resht (on the Caspian) and Tabriz. From time to time it has been devastated by earthquakes. It has some trade in fruit, cottons, and horses. During the European War the town was occupied by the British (in 1918). Pop. 40,000.

Kean, Charles John, actor, son of the tragedian Edmund Kean, born at Waterford 1811, died at London 1868. He was educated at Eton, but, being thrown on his own resources in 1827, he took to the stage, and made his debut at Drury Lane as Young Norval in Home's *Douglas*. In 1830 he visited America, established his reputation, and reappeared as a leading actor in London in 1838, among his parts being Hamlet and Richard III. He married the actress Ellen Tree in 1842, revisited the United States in 1845, and in 1851 became sole lessee of the Princess' Theatre, London, where he put some of Shakespeare's plays on the stage with a splendour never before attempted.—Cf. C. Scott, *The Drama of Yesterday and To-day*.

Kean, Edmund, the most brilliant tragedian of his age, was born in London 17th March, 1787, died at Richmond 15th May, 1833. His parents were connected with the theatrical profession. At two years of age he was placed in a pantomime, at seven he went to school, but ran away, and for a short time he was a cabin-boy in a vessel. Returning to the stage, he ultimately obtained an engagement at one of the minor London theatres. When not yet thirteen years of age, he managed to please his country audiences as Hamlet, Cato, &c., and in Windsor he gained the applause of the royal family in Richard III. He married Mary Chambers, an actress in his company, in 1808. In 1814 he appeared at Drury Lane first as Shylock and then as Richard III. His success was sudden and unexampled, and was equally great in other parts, including Othello, Hamlet, Macbeth, Iago, Lear, &c. Coleridge said of Kean that "seeing him act was like reading Shakespeare by flashes of lightning", and he was highly praised by Hazlitt and Lamb.—BIBLIOGRAPHY: F. Phlippen, *Authentic Memoirs of Edmund Kean*; F. W. Hawkins, *The Life of Edmund Kean*; J. F. Molloy, *The Life and Adventures of Edmund Kean, Tragedian*.

Keats, John, English poet, was born on 29th or 31st Oct., 1795, and died on 23rd Feb., 1821. His father, Thomas Keats, had married the daughter of his employer, John Jennings, and had taken over his father-in-law's business, a livery stable at the sign of the Swan and Hoop, Moorfields. Keats attended a school at Enfield which was kept by John Clarke, and when there

became friendly with his headmaster's son, Charles Cowden Clarke, the Shakespearean scholar, who was an usher at the school, and who encouraged Keats's literary tastes. Keats was a lively and pugnacious boy, but during his last year at school he read all kinds of books with the utmost ardour. He left school in 1810, and was apprenticed to a surgeon named Hammond at Edmonton. In 1814 he cancelled his indentures and went to London, where he studied at Guy's and St. Thomas's Hospitals. He worked hard at medicine, as some of his notebooks testify, but his chief interest was in poetry. Spenser's *Faerie Queene* was what first inspired him to write. In 1816 he became a dresser at Guy's, and made the acquaintance of Leigh Hunt, who was eleven years his senior, and who exercised a great influence over his development. About the same time he met Haydon, the artist, and Shelley. He published his first book in the spring of 1817 under the title of *Poems by John Keats*. This book is full of immaturity, but it contains some good work, and the promise of much better. The sonnet *On first looking into Chapman's Homer* is there; but so is much sham Spenserian and florid writing. It was not received with any enthusiasm, and Keats withdrew from London to the Isle of Wight, in order to get the quietness necessary for composition. In May, 1818, appeared *Endymion: a Poetic Romance*. It was not greatly noticed on its first appearance; but is, as Hunt called it, "a wilderness of sweets". Its faults are those of exuberance rather than those of aridity.

In June, 1818, Keats went on a walking-tour in Scotland, but the exertion was too much for his health, and he was ordered by a doctor at Inverness to return home. Two notorious attacks were made upon the poetry of Keats, one in *Blackwood's Magazine* (Aug., 1818) almost certainly by J. G. Lockhart, and one in *The Quarterly Review* (Sept., 1818) by J. W. Croker. Offensive and ignorant as these articles are, they are by no means exceptional, but are typical of the rancorous criticism of those days. Their bitterness is partly due to party feeling, for Keats and some of his friends, especially Hunt, were Liberals, and Croker and Lockhart were uncompromising Tories. Tom Keats, the younger brother of the poet, died in Dec., 1818, and Keats went to live with his friend Brown. He had fallen passionately in love with a very ordinary girl named Fanny Brawne, who allowed herself to become engaged to him, but who did not bestow much sympathy or understanding upon the super-sensitive poet. In 1819 Keats, although his health was beginning to suffer, was producing some of his best work. By Feb., 1820, he was fatally ill. His third and last book, *Lamia, Isabella, The Eve of St. Agnes, and*

other Poems, appeared in July, 1820. This book contains all his best work. All the poems included in it were written between March, 1818, and Oct., 1819. *Isabella* is a beautifully retold tale of Boccaccio. *Hyperion* is a majestic and Miltonic poem, which marks a great advance upon *Endymion*. *Lamia* is a beautiful poem modelled upon Dryden, but no close imitation. The unrivalled series of odes *To Autumn*, *On a Grecian Urn*, *To a Nightingale*, and the others, are perhaps the greatest of all the poems of Keats. His work now won some recognition, notably a laudatory article by Jeffrey in *The Edinburgh Review*. His health, however, speedily declined, and consumption strengthened its grip upon him. He had attacks of hemorrhage in June, 1820, and in September, accompanied by his friend Severn, he left for Italy. He stayed about a fortnight in Naples, and then went to Rome, where he steadily became worse. He himself spoke of his last weeks as "his posthumous life", and when the end came in Feb., 1821, it was a release. He was buried in the old Protestant cemetery near the pyramid of Gaius Cestius.

For some years after his death a mistaken view of Keats's character prevailed. It was finally dispelled by the publication in 1848 of Lord Houghton's *Life, Letters, and Literary Remains of John Keats*, but it still lingers in certain manuals of literature, and in the minds of ill-informed persons. He was thought to be a mawkish and effeminate man, who permitted himself to be 'snuffed out by an article'. This idea was partly due to the *Adonais* of Shelley, which is a great and noble poem, but which betrays an imperfect understanding of Keats. It is also due to the quotable nature of the clever but callous lines in the eleventh canto of Byron's *Don Juan*. Nothing could be farther from the truth than this idea of Keats. He was eminently manly and level-headed, although in his last days, when his health broke down, he not unnaturally showed signs of a certain morbidity of temperament.

Keats, "the young Marcellus of our tongue", stands among the greatest of English poets, not merely in promise but in performance. He drew his inspiration from some of the best of his predecessors, Spenser, Milton, and Dryden, and his influence has been profound upon the best of his successors, Tennyson, Swinburne, and Morris. He has always been a poets' poet, but he is also loved by all true lovers of romantic poetry.—BIBLIOGRAPHY: R. Monckton Milnes (Lord Houghton), *Life, Letters, and Literary Remains of John Keats*; Sir Sidney Colvin, *Keats* (English Men of Letters Series); W. H. Hudson, *Keats and his Poetry*; J. C. Williamson (editor), *The John Keats Memorial Volume*; Lucien Wolff, *John Keats: sa vie et son œuvre*.

Keble, John, an English divine and poet, born 1792, died 1866. As a zealous High-Churchman he was associated with Newman and Pusey in getting up the famous *Tracts for the Times* (1833). His reputation is chiefly due to his well-known volume of hymns, *The Christian Year*. He also wrote *Lyra Innocentium*, a series of poems on children, and sermons.

Keble College, one of the colleges of Oxford University, built by subscription as a memorial to John Keble, and incorporated in 1870 by royal charter. The charter declares it to be "founded and constituted with the especial object and intent of providing persons desirous of academical education, and willing to live economically, with a college wherein sober living and high culture of the mind may be combined with Christian training, based upon the principles of the Church of England". The college is a flourishing institution, and has the patronage of about a dozen livings.

Kecakemet (kech'ke-met), one of the largest market towns of Hungary. It has an extensive trade in horses and cattle, and much-frequented fairs. Pop. 60,424.

Keel (Dan. *kjö*; Sw. *köl*), bottom plates or timbering, running fore and aft, and forming a base upon which the skeleton of a ship is built up, and which is the 'backbone' of the completed vessel. Modern liners are usually equipped with *bilge keels* to reduce rolling, and *false keels* or *double keels* as a safeguard against foundering.

Keelhauling, a punishment formerly awarded for serious offences in the British and other navies. The delinquent was hung up to the yard-arm, dropped over the side of the ship, and hauled from one side of the vessel to the other, passing underneath the keel. In small vessels one man was dropped over the bow and hauled along the keelson to the rudder-chains, often with a fatal result.

Keeling Islands, or Cocos Islands, a group of coral atolls, Indian Ocean, discovered by Captain Keeling (1609), and acquired by Britain from the Dutch in 1856. They have formed a dependency of the Straits Settlements since 1885. They are managed by a family of Scottish extraction named Ross, who live on Direction Island. The climate is temperate and healthy, but the group is in the cyclone area. Coco-nuts and coconut oil are the chief products, but pigs and poultry are reared, and the lagoon formed by the atolls abounds in fish. There is a wireless station. On 9th Nov., 1914, the German cruiser *Emden* attacked the Cocos group, and was destroyed there by H.M.A.S. *Sydney*. Pop. 800.

Keene, Charles Samuel, black-and-white artist, was born at Hornsey in 1828, died at Hammer-smith in 1891. After a year or two in a solicitor's

office, at the age of nineteen he was apprenticed to Messrs. Whympers, wood-engravers. Five years later he began work for *The Illustrated London News* and other papers, and in 1851 he first appeared in the pages of *Punch*, in 1860 being taken on the staff. From this time till within a few months of his death he contributed continuously to that famous periodical. He was also a regular contributor to *Once a Week*, and illustrated a few books, including Thackeray's *Roundabout Papers*. Keene's work, with subjects taken mostly from the humbler walks of life, is marked by fine and expressive draughtsmanship and great powers of characterization.

Keene, a city of New Hampshire, United States, 40 miles south-west of Concord, with manufactures of boots and shoes and wooden goods. It was settled in 1734, when it was known as Upper Ashuelot; its name was changed to Keene in 1753, and it became a city in 1874. Pop. (1920), 11,210.

Keighley (kēth'la), a municipal borough of the West Riding of Yorkshire, England, with manufactures of woollen and worsted goods, worsted-spinning machinery, machine-tool works, iron-foundries, and sewing-machine works. Keighley 'adopted' (in 1921) the town of Poix-du-Nord, in France, damaged during the European War. Pop. (1921), 41,942.

Kei River, Great, in South-East Africa, formerly the boundary between British Kaffraria and Kaffraria proper, rises, with its branches the Black and White Kei, in the Stormbergen Mountains, and flows south-west into the Indian Ocean.

Keith (kēth), a distinguished Scottish family, to which belonged the hereditary office of Grand-Marshal of the kingdom. The first Earl-Marischal was William Keith, created earl in 1458. A successor of his, the fifth Earl-Marischal, founded and endowed Marischal College and University, Aberdeen. The family had at one time great estates, their head-quarters being in Aberdeenshire and Kincardineshire, in which latter county Dunnottar Castle was their seat. The most celebrated of the Keiths was James, field-marshal under Frederick the Great, son of William Keith, ninth Earl-Marischal, born 1696, died on the battlefield of Hochkirch, 1758. His brother George, tenth Earl-Marischal (born 1685, died 1778), was forced to leave Scotland for his share in the Jacobite rising. He afterwards joined his brother James in Berlin, and also gained the favour of the king, to whom he made himself highly useful as a diplomatist.—BIBLIOGRAPHY: P. Buchan, *An Account of the Ancient and Noble Family of Keith*; B. Taylor, *The Great Historic Families of Scotland*; Sir Robert Douglas, *Peerage of Scotland*.

Kekulé, Friedrich August, German chemist,

was born at Darmstadt in 1829. He was professor at Ghent and afterwards at Bonn, where he died in 1896. His discoveries of the quadrivalence of carbon, and of the ring distribution of the six carbon atoms in the molecule of benzene, have had a profound influence on the development of organic chemistry and its practical applications.

Kelan'tan, or Kalantan, a state in the Malay Peninsula, since 1909 under British protection, on the east coast, intersected by a river of the same name, which has the capital, Kota Bharu, near its mouth. The area is about 5500 sq. miles, the pop. 300,000. See *Malaya*.

Kelat', Kalat', or Kheilat', a town of Beluchistan, capital of the territories of the Khan of Kelat, occupies the side of a hill at a height of nearly 7000 feet above the sea. It is surrounded by a mud wall flanked with bastions, and the streets are narrow and filthy. The manufactures consist chiefly of small-arms and sword cutlery; and there is a small trade with Sind, Bombay, and Kandahar. Kelat was stormed by the British in 1830, recaptured by insurgents from a weak garrison of sepoys, and again taken by the British. Pop. estimated at 12,000.

Kellermann, François Christophe, Duc de Valmy, Marshal and peer of France, born 1735, died 1820. He joined the army as a volunteer in 1752, distinguished himself during the Seven Years' War, and rose rapidly to the command of an army corps. At the commencement of the revolutionary war he received the command of the army of the Moselle, formed a junction with Dumouriez, and sustained the 'cannonade of Valmy', which caused the allies to retreat. In the following wars Kellermann received various commands, and Napoleon lauded him with honours. After the restoration of the Bourbons he was appointed a member of the Chamber of Peers. His son, François Étienne Kellermann, second duke, born 1770, died 1835, also distinguished himself in the Napoleonic wars, in Italy, in the Peninsula in the campaign of 1813, at Ligny, and at Waterloo.

Kells (originally Kenils), a market town of Ireland, County Meath, picturesquely situated on a small hill near the Blackwater. It is a very ancient town with a round tower, and was formerly a place of much ecclesiastical importance. Pop. 2400.

Kelly, Edward (known as Ned), Australian bushranger, born in Australia (1854), was the eldest son of a deported Belfast convict. At an early age he was sentenced to three years' imprisonment for horse-stealing. In 1878 an attempt was made to arrest Dan Kelly, Ned's brother, on a similar charge, but the family offered an effective resistance by which the two brothers were enabled to escape into the bush. Here they joined

two men, named Byrne and Hart respectively, and the gang terrorized Victoria and New South Wales for two years, burning banks and pillaging towns. They were very gallant towards women, and the fact that they never robbed the poor and were reputed to maintain an excellent system of espionage explains their long immunity from arrest. Eventually the gang were rounded up in an 'hotel' near Benalla. Ned Kelly could have escaped, but he refused to desert his companions, was seriously wounded, captured, tried, convicted, and hanged in Oct., 1880.—Cf. F. A. Hare, *The Last of the Bushrangers*.

Kelp, the ash produced by burning certain seaweeds, especially the large *Laminarias*; it contains soda, potash, and iodides among other salts. Kelp-burning was at one time a regular and lucrative industry in the Hebrides and elsewhere, but was practically destroyed by the competition of cheaper imported chemicals. During the European War it was revived, and, if developed along more scientific lines than those formerly in vogue, may once more become of considerable importance. The name is also applied to the seaweeds themselves (*Laminariaceae*).

Kelso, a Scottish town and police burgh of Roxburghshire. In the outskirts of the town are the magnificent ruins of Kelso Abbey, founded and endowed by David I in 1128. It is in the form of a Latin cross, and is a fine specimen of the Norman style of architecture. In the immediate vicinity is Floors Castle, the seat of the ducal family of Roxburghe. Pop. 3527.

Kelung, or **Kilung**, a town and seaport in the northern part of the Island of Formosa, opened to foreign commerce in 1863. Coal-fields are worked near it, and quantities of coal are exported. There is also an extensive export trade in rice, sugar, and camphor. Pop. 17,000.

Kelvin, William Thomson, Baron, mathematician, physicist, and inventor, was born at Belfast in 1824, his father being James Thomson, who afterwards became professor of mathematics in Glasgow University. After taking the Glasgow arts course he entered Peterhouse, Cambridge, and graduated in 1845 as Second Wrangler and first Smith's prizeman. He began original work at an early age, and published several papers in the *Cambridge* and *Dublin Mathematical Journal* while still in his teens. In 1846 he was appointed to the chair of natural philosophy in Glasgow University, a post which he held till 1890. After the final successful laying of the Atlantic cable in 1860, an achievement largely due to Thomson's theoretical and practical skill, he was knighted. In 1892 he was raised to the peerage as Baron Kelvin of Largs. For a great part of his life Kelvin was universally regarded as the leading scientist of his

time. He was president of the British Association in 1871, and of the Royal Society from 1890 to 1895. The celebration of the jubilee of his professorship in 1896 was attended by nearly every eminent living scientist. He died in 1907, and was buried in Westminster Abbey.

Kelvin's theoretical work ranged over all physics, and he made important advances in thermodynamics, heat, electricity and magnetism, elasticity, and hydrodynamics. But he is best known, perhaps, for his practical inventions, which included electrical measuring instruments of all kinds (e.g. the mirror galvanometer and the quadrant electrometer), a machine for taking flying deep-sea soundings, a tide predictor, and an improved form of the mariner's compass. Thomson and Tait's *Natural Philosophy*, written in collaboration with Professor P. G. Tait, is still a standard treatise on dynamics. Kelvin's collected mathematical and physical papers have been published in five volumes; the papers on electrostatics and magnetism appeared separately in 1874.—Cf. Silvanus P. Thompson, *Life of William Thomson, Baron Kelvin of Largs*.

Kemble, Charles, English actor, born 1775, died 1854, the youngest son of Roger Kemble, and brother of John Philip Kemble. He was educated at Douai (France), returned to England in 1792, obtained a situation in the post office, but relinquished it in favour of the stage in 1794, when he made his first appearance at Drury Lane. His success was largely due to his representations of such characters as Edgar, Romeo, Charles Surface, Antony, Mercutio, Macduff, &c., and to his fine voice, handsome face, and figure. Macready said of him that he was "a first-rate actor in second-rate parts". He was appointed censor of plays in 1840, when he retired from the stage, and only gave occasional Shakespearian readings. He had married the favourite actress Miss Marie de Camp in 1806, by whom he was the father of John Mitchell Kemble, Frances Anne Kemble, and Adelaide Kemble.

Kemble, Frances Anne, popularly known as Fanny Kemble, writer and actress, eldest daughter of Charles Kemble, and niece of Mrs. Siddons, was born at London 1809, and died in 1893. She first appeared on the stage at Covent Garden as Juliet, in 1829. Among her writings are the tragedy *Francis I* (in which she herself acted the part of Louis of Savoy), *Journal of a Residence in the United States*, *Journal of a Girlhood*, *Records of Later Life*, and her *Notes on Some of Shakespeare's Plays*. As an actress she excelled in the characters of Portia, Beatrice, Lady Macbeth, Lady Teazle, and of Julia in Sheridan Knowles's *The Hunchback*.—Her younger sister Adelaide, born 1820, greatly dis-

tinguished herself on the operatic stage, but retired on her marriage in 1843.

Kemble, John Mitchell, an eminent Old-English scholar, son of Charles Kemble, born 1807, died 1857. He graduated at Cambridge, and, having taken up the study of Old-English, spent a considerable time in studying the ancient MSS. in the libraries there. He edited *Beowulf* (1833) and other Old-English works, including an incomplete edition of the Old-English Gospels, and a collection of all the known charters of the Old-English period, under the title of *Codex Diplomaticus Aevi Saxonici*. Perhaps his most valuable work (only complete so far) is the *Saxons in England* (London, 1849, 2 vols.). For a number of years he edited the *British and Foreign Review*, and from 1840 until his death he acted as censor of plays.

Kemble, John Philip, actor, eldest son of Roger Kemble (theatrical manager), born at Preston 1757, died at Lausanne 1828. He was sent to the Roman Catholic college of Douai (France), where he distinguished himself by his fine elocution; but, in spite of his parents' opposition, he selected the stage as a profession, made his first appearance at Drury Lane in 1783, and at once became popular. He was manager of this theatre from 1788 to 1802. From 1801 to 1803 he successfully toured France and Spain, and on his return to London he purchased a share in the Covent Garden Theatre, and made himself a splendid reputation in the characters of Julius Cæsar, Hamlet, Macbeth, and Coriolanus. His theatre having been burned down, he opened the new edifice in 1809 with an increase of prices, which, together with certain other unpopular arrangements, created for a series of nights the notable disturbances known by the name of the *O. P. (old price) Riots*. He abandoned the stage in 1817. His statue was placed in Westminster Abbey in 1833. His acting was distinguished for dignity, precision, and studious preparation, but was wanting in fire and pathos. His sister Sarah was the celebrated Mrs. Siddons.—Cf. P. H. Fitzgerald, *The Kembles: an Account of the Kemble Family*.

Kempis, Thomas à. See *Thomas à Kempis*.

Kempten, a Bavarian town on the Iller, 81 miles s.w. of Munich. There is a seventeenth-century abbey church and an old town hall. It has large cotton-mills, woollen- and linen-factories, and much-frequented fairs. Pop. 21,000.

Ken, Thomas, English prelate, born 1637, died 1711. After studying at Oxford he became successively chaplain to the Princess of Orange, to the Earl of Dartmouth, and in 1684 to Charles II, who made him Bishop of Bath and Wells. In 1688 he was sent to the Tower for resisting the dispensing power claimed by James II, and yet some months later he refused to take the

oath of allegiance to William of Orange, and was dispossessed of his see; but Queen Anne granted him a pension. His sermons and moral treatises have long been forgotten, but his Morning and Evening Hymns are still in use.—Cf. E. H. Plumptre, *Life and Letters of Bishop Ken*.

Kendal, an English manufacturing town, county Westmorland, situated on the Kent. Amongst its manufactures are serges, carpets, tweeds, knitted goods, and fish-hooks. Pop. (1921), 14,140.

Kenilworth, a town of Warwickshire, England. Kenilworth Castle, now a magnificent ivy-covered ruin, was founded in the reign of Henry I. The gorgeous entertainment given there in 1575 to Queen Elizabeth by the Earl of Leicester is familiar to all from Scott's romance of *Kenilworth*. Pop. (1921), 6752.

• **Kennedy**, Benjamin Hall, English classical scholar and schoolmaster, was born in 1804, died in 1880. He was educated at Shrewsbury under Dr. Butler, and at St. John's College, Cambridge. Both at school and university he had a brilliant career, graduating in 1827 as senior classic, senior optime, and first chancellor's medallist. In 1836 he was appointed headmaster of Shrewsbury in succession to Dr. Butler, and here he remained for thirty years, turning out a remarkable number of brilliant scholars; among them H. A. J. Munro and J. E. B. Mayor. In 1867 he was appointed regius professor of Greek at Cambridge, and Canon of Ely, and held these offices till his death. Among his works are: *The Public School Latin Primer*; *The Public School Latin Grammar*; and *Between Whiles, or Wayside Amusements of a Working Life*.

Kenneh, or **Keneh**, a town of Upper Egypt, on the right bank of the Nile, well known for its pottery manufacture, and carrying on a considerable trade with Arabia and India by way of Kosseir. Pop. 20,053.

Kennington, a parliamentary division of Lambeth, London. It contains Kennington Oval, the famous Surrey County cricket ground, and Kennington Park, the scene of the Chartist assembly (1848).

Kenōsis (Gr., literally an emptying), a Christological doctrine, which lays stress on the human development of Christ. The *Lagos*, in the act of incarnation, laid aside, or emptied Himself of, His divine attributes and also His divine self-consciousness, which He gradually regained in the course of His earthly life, having done so completely by the time of the ascension. The doctrine takes its name from a passage in *Phil.* ii, 7, translated in the ordinary version, "made himself of no reputation", in the revised version, more literally, "emptied himself". The doctrine has been the subject of considerable controversy, and the great objection to it lies

in the unchangeability of God.—Cf. W. Sanday, *Christologies, Ancient and Modern*.

Kensal Green, a suburb in the north-west of London, with a cemetery which was the burying-place of many famous people, including Thackeray, Leigh Hunt, John Leech, Thomas Hood, Robert Owen, and Anthony Trollope. It covers 70 acres.

Ken'sington, a municipal and parliamentary borough and western suburb of London. Kensington Palace, the birth-place of Queen Victoria; Kensington Gardens, 350 acres; Horticultural Society's Gardens; Albert Memorial; Royal Albert Hall; Victoria and Albert Museum; Indian Museum; British Museum of Natural History; and the University of London (the Imperial Institute being in the same building), are all in Kensington. Pop. (1921), 175,086.—Cf. W. J. Loftie, *Kensington, Picturesque and Historical*.

Kensington (South) Museum, or Victoria and Albert Museum, a museum in London, originated by Prince Albert, and first opened in 1857, receiving the second name above in 1869 when the foundation stone of new buildings was laid by the queen. It contains probably the most beautiful and generally interesting collection in Europe, comprising objects of industrial art, both ancient and modern, products and materials used in manufactures, building, engineering, &c.; reproductions of ancient sculpture and architecture, modern paintings in oil and water-colour, and sculpture by British artists, besides occasional loan collections. It is under the direction of the Board of Education and receives large Government grants. It forms the centre of industrial art education in Great Britain, and schools of science and cookery are also connected with it.

Kent, William, English landscape-gardener, architect, and painter, was born 1685, died 1748. He was apprenticed to a coach-painter, but repaired to London, tried his hand at portrait and historical painting, and with the assistance of some of his patrons was enabled to study for some years in Italy. On his return he carried out some architectural work, notably the *Horse Guards* in Whitehall, but he is best known as the founder of modern landscape-gardening.

Kent, maritime county of England, forming the south-eastern extremity of the kingdom; area, 975,065 acres. The county is of great historical interest. Cæsar made his first landing near Dover, and many Roman camps and relics of the colony which he founded are to be found on either side of the ancient Roman roadway, *Watling Street*, which traverses the present county from Dover to London. Hengist and Horsa invaded Kent (Thanet) about A.D. 455, and established an Anglo-Saxon kingdom which,

having Canterbury (q.v.) as its capital, eventually became one of the most important of the Anglo-Saxon heptarchy. It was in Thanet, also, that St. Augustine landed with his monks on their mission to convert Britain to Christianity.

The modern county is the home of picturesque English rural scenery, and Kent has well been called the 'Garden of England'. Many celebrated watering-places encircle its shores, and Dover is one of the most important ports of communication with France, from which a cross-channel tunnel has been frequently advocated as a means of firmly cementing the British *entente* with France. There are magnificent cathedrals at Canterbury and at Rochester, and mediæval castles and mansions are to be found in several towns. Hops are cultivated, and there are many dairy-farms and market-gardens. There is a certain amount of coastal fishing, but the oyster 'natives' of Whitstable are of more importance. Gunpowder is manufactured, and there are great paper-mills at Gravesend. Chatham is famous for its extensive Admiralty dockyards and colossal naval barracks; but it is also a military centre, although secondary to Aldershot in this respect. In sport, Kent is best known as a cricketing county. Its literary associations are inseparable from Chaucer, whose *Canterbury Tales* are related wholly in Kent. Dickens drew upon Kentish scenery for description in *David Copperfield*, and Thackeray, Barham (*Ingoldsby Legends*), and many others have found inspiration from Kent and Kentish places. The county town is Maidstone. Pop. (1921), 1,141,867.—**BIBLIOGRAPHY:** R. J. King, *A Handbook for Travellers in Kent and Sussex*; J. Hutchinson, *Men of Kent and Kentish Men*; W. Jerrold, *Highways and Byways in Kent*.

Kent's Hole, a cavern near Torquay, Devonshire, England, in which have been found many bone implements of Palæolithic type. It was first examined in 1825 by J. M'Enery, and afterwards explored by M. Godwin Austen in 1840, and by W. Pengelly (1864-80). See *Cave*.

Kentucky, one of the United States, bounded north by Ohio and Indiana, north-west by Illinois, west by Missouri, south by Tennessee, and east by Virginia and West Virginia; area, 40,508 sq. miles. The surface of the state is gently undulating, excepting the south-east, which is somewhat mountainous. Few states are better provided with water communication. The Ohio forms the boundary on the north, and receives from within the state numerous tributaries, of which the most important are the Cumberland, Kentucky, and Tennessee; the Mississippi, after receiving the Ohio, forms the boundary on the west. The climate is salubrious, the soil fertile, the principal crops being wheat, Indian corn, and tobacco; but oats, barley, hemp,

and fruit are extensively raised, and stock breeding is another important feature, the Kentucky cattle and horses especially being celebrated. The 'blue-grass' region furnishes admirable pasture. Coal and iron ores of various descriptions abound in many parts of the state. Limestone occupies a large area, and in this formation are the Mammoth Cave and others. The chief manufacturing industries comprise cotton- and woollen-factories, ironworks, and tanneries. The central position of the state, and the abundant water and railway communication, have secured it a rapid commercial development. Kentucky originally formed part of Virginia, but was separated from it in 1789, and admitted into the Union 4th Feb., 1791. The seat of government is Frankfort, a comparatively small place; the oldest town is Lexington; but the largest and most important is Louisville. Pop. (1920), 2,416,630.—BIBLIOGRAPHY: E. P. Johnson, *History of Kentucky and Kentuckians*; R. M. McElroy, *Kentucky in the Nation's History*.

Kentucky River, a river of the United States, rises in the Cumberland Mountains, traverses the state of Kentucky, and after a course of 200 miles flows into the Ohio at Carrollton. By a series of improvements the lower portion has been rendered navigable by steamers.

Kenya a mountain of Kenya Colony, in Kenya province, 100 miles north of Nairobi. It is 17,044 feet in height, perpetually snow-capped, and has many glaciers. The peak is the denuded core of a volcano.

Kenya Colony (formerly **British East African Protectorate**), a large area bounded south by Tanganyika (formerly German East Africa), west by Uganda, north by Abyssinia, and north-east by Italian Somaliland. The coastal line extends to 450 miles, and is bounded by the Rivers Juba on the north and Umba in the south, both being navigable for some 400 miles upstream by shallow-draught steamers. Kenya is a Crown colony, and was annexed by the Crown on 23rd June, 1920. It is governed by Executive and Legislative Councils, and has an area of 246,822 sq. miles. For administrative purposes the districts colonized by whites are under the jurisdiction of resident magistrates, the purely black element having specific 'reserves' administered by native Commissioners. There are eight provinces: Seyidie (capital, Mombasa), Ukamba (Nairobi), Tanaland (Namu), Tubaland (Kismayu), Kenya (Nyeri), Nyanza Province (Kisumu), and the Northern District (Moyale). The total population is estimated at 2,807,000, of which 5000 are European and 17,000 Asiatics. Mombasa, on an island of the same name, is the largest town (pop. 80,000, 100 being Europeans), and has a harbour navigable at any state of the tide. Kilindini harbour is the

finest in East Africa. It lies upon the south-east side of Mombasa Island, and is navigable at all times. The entries to both ports have become much narrower within recent years on account of the rapid formation of coral reefs, of which the majority (and the Andromache Reef at Kilindini in particular), are exposed at low tide. Nairobi is the capital of the colony and the seat of government (pop. 14,000, 800 being Europeans). There are many European farmers located near Nairobi. Kenya Colony has been called the *Huntsman's Paradise*, and is also reputed to be one of the most promising territories in the agricultural world. In the low-lying coastal districts tropical crops flourish, maize, coco-nuts, and rice being produced; rubber also thrives. Farther inland, as the level gradually rises, the highlands have been partially settled by European farmers. Dairying is profitable; ostrich- and sheep-farming are progressive. The coffee plantations are expected in course of time to rival the fazendas of São Paulo both in the quality and in the quantity of their produce, and, although all cereals and vegetables can be raised lucratively, a great scope is offered to the wheat grower with a perfect soil and such favourable climatic conditions. There is much timber around Nairobi, which is connected by the Uganda State Railway (618 miles) with Mombasa, and through which it runs towards Victoria and Lake Victoria Nyanza. A telegraph system is run in connection with the railway. Some minerals have been discovered, but not in paying quantities. The standard currency is the Indian rupee, but British gold is also accepted.

Ke'okuk, a city of Iowa, United States, at the foot of the lower rapids of the Mississippi. It is an important business centre, and has numerous flour- and saw-mills, foundries, and pork-packing establishments. Settled in 1820, it became a city in 1848. Pop. (1920), 14,423.

Kepler, Johann, German mathematician and astronomer, born 1571 near Weil (Württemberg), died at Ratibon 1630. He studied at the University of Tübingen, and in 1593 he was appointed professor of mathematics at Gratz (Styria). Here he devoted himself to the study of astronomy; but in 1599 the religious persecutions commenced in Styria, and Kepler, being a Protestant, gladly accepted Tycho Brahe's invitation to Prague, to assist in the preparation of the new astronomical tables, called the *Rudolphine Tables*. Tycho died in 1601, and Kepler continued the work alone, being appointed Imperial mathematician and astronomer. After twenty-five years' incessant labour the tables were published in 1627 at Ulm. Kepler had become the happy possessor of all Tycho's papers, and the mass of observations made by that astronomer during twenty

years, with a precision till then unsurpassed, enabled Kepler to establish his three laws which have proved so fruitful in the development of astronomical science. Kepler enjoyed the patronage of the Emperors Rodolph and Ferdinand, the Dukes of Württemberg and Wallenstein, but his life was a continued struggle; he was exposed to much religious persecution, and his domestic relations were equally unfortunate. The latter part of his life was chiefly passed at Linz as professor of mathematics. He wrote much, but the work that has rendered him immortal is his *Astronomia Nova, seu Physica Cœlestis tradita Commentariis de Motibus Stellæ Martis* (New Astronomy, or Celestial Physics delivered in Commentaries on the Motions of Mars; Prague, 1609, folio).—BIBLIOGRAPHY: J. L. C. Breitachwert, *Johann Kepler's Leben und Werke*; Sir D. Brewster, *The Martyrs of Science: Galileo, Tycho Brahe, and Kepler*; Otto Closs, *Kepler und Newton und das Problem der Gravitation*.

Kepler's Laws, in astronomy, three laws discovered by Kepler on which were founded Newton's discoveries, as well as the whole modern theory of the planets. (1) Every planet describes an ellipse, the sun occupying one focus. (2) The radius vector (line joining the centre of the sun to the centre of the planet) of each planet sweeps over equal areas in equal times. (3) The squares of the periodic times (the periods of complete revolution round the sun) of two planets are proportional to the cubes of their mean distances from the sun. These laws enabled Newton to determine the law of gravitation.

Keppel, Augustus, a British admiral, born 1725, died 1786, was the second son of the Earl of Albemarle. He entered the navy as a boy, and accompanied Anson round the world (1740–5). He was given command of the Channel fleet in 1778, and in July of that year engaged the French fleet off Ushant. Having become partly disabled, he signalled for his van and rear divisions, but Pulliser, in command of the rear, ignored the signal until too late. Pulliser accused him of incapacity and cowardice, but Keppel was honourably acquitted, and received the thanks of both Houses of Parliament. In 1782 he was raised to the peerage under the title of Viscount Keppel and Baron Eldon. He was First Lord of the Admiralty in the Cabinets of the Marquess of Rockingham and the Duke of Portland in 1782 and 1783.

Ker'bela, or Meshed Hussein, a town of Mesopotamia. It contains the tomb of Hussein, son of the Caliph Ali, and grandson of Mahomet. It is a very ancient city and holy to Mahomedans, especially to the Shiites, who make pilgrimages there in thousands. It is also a starting-point for the pilgrimage to Mecca.

Some of the pilgrims carry to Kerbela the bones of relatives for burial there, and the fees exacted form an important revenue. Pop. about 65,000.

Kerensky, Alexander Feodorevitch, Russian barrister-politician, born 1881, of Jewish extraction, joined the Russian Labour party and sat in the Duma as a moderate Socialist. He was a recognized legal defender of political criminals. On the Revolution he was appointed Minister of Justice, and soon became head of the Government. In conflict with Kornilov (q.v.), who demanded a military dictatorship, he removed him from the High Command, where he had superseded Brusilov, and proclaimed the Russian Republic, with himself as Prime Minister (15th Sept., 1917). On the Trotsky-Lenin coup (8th Nov., 1917) Kerensky left Petrograd, and subsequently appeared in London (June, 1918).

Kerguelen Island (ker'ge-len), or Desolation Island, an island in the southern limit of the Indian Ocean, discovered by the French navigator Kerguelen in 1772, annexed by France in 1803; but not permanently settled. It is of irregular shape, much cut up by fjords and inlets and surrounded by islets; greatest length, about 100 miles; highest summit, 6200 feet. The scenery is picturesque and often magnificent; glaciers and snow-fields occupy a considerable area. The climate is wet and stormy, the temperature never very high nor very low. The fauna and flora are somewhat limited. The former includes the fur seal, sea elephant, and numerous penguins, petrels, and the albatross; the latter is most abundant in the form of mosses and lichens, but the most peculiar form is the Kerguelen cabbage (*Pringlea antiscorbutica*), a perennial cruciferous plant much valued by seamen of whalers and sealers on account of its antiscorbutic properties. Cook visited the island in 1777, Ross in 1840, the *Challenger* Expedition in 1874, and in 1874–5 parties from Britain, Germany, and the United States were stationed here to observe the transit of Venus.

Kerkuk', officially called *Shahr-zul*, a town of Mesopotamia. There are petroleum and naphtha springs in its neighbourhood, and it has considerable trade. Pop. (chiefly Kurds and Jews), about 23,000.

Kermadec Islands, since 1840 a British dependency, but formally annexed and attached to New Zealand in Aug., 1887. They consist of two principal islands, surrounded by a number of small islets and rocks. The most northerly and the largest is Raoul, or Sunday Island, 674 miles north-east of Auckland; area, 7200 acres. They are of volcanic origin, and earthquakes and other disturbances have frequently taken place. The highest peak is 1723 feet above sea-level. Vegetation is luxurious, the flora being similar to that of Northern New Zealand;

fish and birds are plentiful. There is no good harbour. The first settlers were two Englishmen married to Samoan girls, who landed on Sunday Island in 1837, but quitted it again in 1848. Others have been there since for shorter periods, but the islands are at present uninhabited. The greatest measured depth of the Southern Pacific, 5·8 English miles, occurs off Macaulay Island. Total area of islands, 15 sq. miles.

Kermân', Kirmân', or Sirgân, a town in Persia, capital of a province of the same name. It has numerous mosques, baths, caravanserais, and a well-furnished bazaar. Its manufactures consist of silks, shawls, and woollens. Pop. estimated at 70,000.—The province of *Kerman*, in the south-east of Persia, has an area of 60,000 sq. miles, and a population of about 300,000.

Kermanshah', or Kirmanshahân', a town in Persia, province of Ardilân. The manufactures consist chiefly of carpets; the trade, chiefly transit by the routes from Bagdad, Shuster, and Ispahan, is considerable. During the European War it was occupied by the British in 1918. Pop. about 40,000.

Ker'osene. See *Petroleum*.

Kerria, a genus of Rosaceous shrubs. The only species, *K. japonica*, is commonly grown in shrubberies or against walls; its flowers are bright-yellow and rather showy.

Ker'ry, a maritime county of Ireland, on the south-west coast, in the province of Munster; area, 1,161,732 acres. Great part of it is mountainous, Carran Tual, the highest peak in Ireland, attaining a height of 3414 feet above sea-level; other parts are very fertile, producing excellent pasture and good crops of oats, barley, and potatoes, but agriculture is much neglected. The climate is mild and moist. The coast is much indented by bays and inlets (Dingle Bay, Kenmare River, &c.); the interior presents much fine scenery, including the picturesque lakes of Killarney. Iron ore, copper, and lead exist, and a superior kind of slate and flagstone are obtained in great quantities in the Island of Valentia. The chief exports are oats and dairy produce. Principal towns, Tralee, Killarney, and Listowel. Pop. (1911), 159,601.

Kertch, or Kerch (ancient *Panticapæum*), a seaport town of Russia, in the Crimea, on the Strait of Yenikale, which connects the Sea of Azov with the Black Sea. The modern town is of quite recent existence; it is well built, advantageously situated for commerce, and has a considerable trade. Pop. 55,883.

Kesteven (The Parts of Kesteven), a subdivision of Lincolnshire, forming its south-west part, since 1888 an administrative county by itself. The Parts of Kesteven unite with Rutland in returning two members to Parliament. Area, 469,142 acres; pop. (1921), 108,237.

Kestrel, or Windhover (*Tinnunculus alaudarius*), a species of the falcon sub-family, widely distributed in Europe. It is remarkable for its habit of remaining suspended in the air by means of rapid wing motion, being at this time on the look-out for mice, which are its chief food. At times it will also eat small birds, and insects frequently. It varies from 12 to 15 inches in length; it nests in trees, also in old towers and buildings, and often utilizes an old crow's nest. In winter it migrates to North Africa and India.

Keswick (kes'ik), a town of England, in the county of Cumberland, on the Creta, near Lake Derwentwater. Lead pencils and woollens are manufactured, but the inhabitants depend chiefly upon the visitors to the romantic scenery in the neighbourhood. Southey's residence, Greta Hall, is there. Every summer a religious convention is held at Keswick. Pop. (1921), 5559.

Ketones, the name given to a particular group of carbon compounds, of which acetone is the simplest representative. As a group they closely resemble the aldehydes. A ketone contains the carbonyl group (CO) united to two univalent hydrocarbon radicals. Acetone, e.g., is CH_3COCH_3 .

Kettering, an ancient market town of England, Northamptonshire, on the Midland Railway, 72 miles from London. It has a large corn market, and a museum and gallery, the gift of Sir Alfred East, which houses numerous specimens of his art. Boot and shoe manufacturing is the staple trade, but tanning, currying, and the manufacture of agricultural implements are also of importance. The Baptist Missionary Society was formed at Kettering in 1792. The town gives its name to a parliamentary division of the county. Pop. 29,692.

Keuper, a name used for the terrestrial and lacustrine Upper Triassic series in central Germany, and also in the British Isles.

Kew, a suburb of London, county of Surrey, England, on the right bank of the Thames, opposite Brentford (to which a stone bridge crosses), and in the borough of Richmond. The Royal Botanic Gardens, commonly called *Kew Gardens*, belonging to the nation, are a great attraction for visitors to Kew. They contain the finest collection of plants in the world (about 24,000 different species), and are open free to the public.

Kewatin (kē-wat'in), or Keewatin, a former Canadian territory, but now distributed to the provinces of Manitoba, Ontario, and the North-West Territories; the area was about 450,000 sq. miles. A railway is being constructed linking up the Canadian National main system with Port Nelson and York on Hudson Bay, and a further

line may be projected to Churchill, farther north. It is suggested that this line may facilitate the handling and shipment of grain from the northern districts of Canadian provinces, an outlet being found (in season) via Hudson Bay.

Kew-Kiang, or **Kiu-Kiang**, a town and seaport of China, province of Kiangsi, on the south bank of the Yangtze-kiang. It is not an extensive commercial port, but derives importance from its connection with the green-tea districts. The port was opened to foreign trade in 1861,

in Akola district, Berar, with a trade in cotton, grain, and opium. Pop. 10,000.

Khan, a title given by Tartars, Persians, and other Eastern nations to princes, chieftains, commanders, and governors, but now generally reserved for governors of cities and provinces, these provinces being called *khanates*. Jenghiz Khan, the Mongol ruler, was the first to call himself *Khan*, although Gregory of Tours (A.D. 560) already designates the chief of the Huns (Avars) as *Chagnus*. **Khan** is also another term for

caravanserai, of which there are two kinds: one for pilgrims and travellers, with gratuitous entry, another, more commodious and with locked apartments, for traders, subject to a nominal charge.

Khandesh (*khān-dāsh'*), a district of British India, Bombay Presidency, forming the most northerly portion of the Deccan tableland, and intersected by the Tapi River; area, 9989 sq. miles; pop. 1,615,000.

Khandwa', a town of India, Central Provinces, with a large trade. Pop. 21,000.

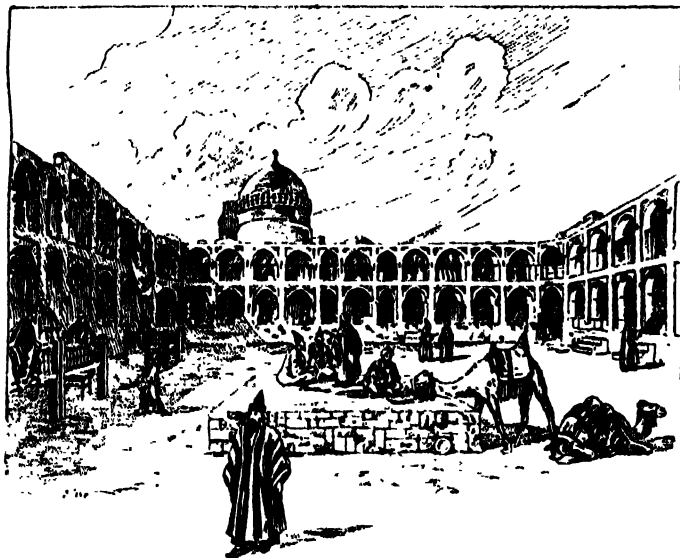
Khargeh (*hār'jā*), or **Wahia El Kharga**, a town in Upper Egypt, about 100 miles s.w. of Girgeh, the capital of the oasis of the same name, and an important station for caravans on

the way to Darfur and Central Africa. It contains numerous ruins, and an acropolis of great interest. Pop. about 8000.

Kharkov (*hār-kov'*), or **Charkov**, a government of the south of Russia; area, 21,041 sq. miles; pop. 3,452,000. The country is open, the climate mild, the soil usually fertile, and agriculture is the chief pursuit of its inhabitants. The capital, Kharkov, has a considerable trade in cattle and grain, and manufactures beet-sugar, soap, candles, and leather. During 1823 it became the Ukrainian capital. Pop. 258,360.

Kharput (*hār'put*), a town of Armenia, 60 miles north of Diarbekir, picturesquely situated on a rocky eminence in a plain watered by the Euphrates; a centre of American missionary effort. Pop. 25,000 to 30,000.

Khartum (*hār-tōm'*), capital of the Anglo-Egyptian Sudan, in the angle formed by the junction of the Blue with the White Nile. Founded by Mehemet Ali in 1880, it became the chief town in the Egyptian Sudan, and a great



Khan: Caravan-Serail-i-Chah, Casbin

when the population was 10,000; it is now about 30,000.

Key West, a small, low-lying coral island at the southern extremity of Florida, United States. It is 75 miles from the mainland, with which it is connected by the Florida East Coast Railway, running on piers and arches over the forty-two keys. The railway cost \$4,000,000, and occupied seven years in building. Key West is the United States naval station in the south-east, and has become of great strategic importance as a guardian of the Panama Canal. The city is defended by a fort, and is a healthy winter-resort. Its nearness to the Cuban tobacco plantations has been the means of providing it with industries in raw and manufactured tobaccos. Settled in 1822, it became a city in 1882. Pop. 18,749.

Khabarovsk, a town of Eastern Siberia, capital of the Maritime Province, at the confluence of the Amur and the Ussuri. Pop. 51,000.

Khamgaon (*khām-gā'on*), a town of India,

emporium of trade. It was the scene of Gordon's heroic defence and death in fight against the Mahdists in 1885, but was ruined in the Mahdi troubles, being supplanted by Omdurman on the opposite side of the White Nile. Restored by the British after the battle of Omdurman (1898), it is the seat of the Gordon College for the Sudanese, and has other fine public buildings. Having easy communication by rail and river, it attracts many strangers. Pop. 23,083.—Cf. G. W. Stevens, *With Kitchener to Khartum*.

Khasi and Jaintia Hills, an administrative district of Assam; area, 6157 sq. miles; pop. about 161,000. The Khasis are a peculiar race, speaking a monosyllabic agglutinative language that seems to have no affinities with other Indian tongues.

Khatmandu (khāt-mān-dō'), or **Katmandu**, capital of Nepāl, a kingdom in Northern India, on the left bank of the Baghmati, on an elevated plateau, 150 miles north by west of Patna, with which it is connected by an important trade route. It is well built, and has many picturesque temples and pagodas. The chief building is the palace of the Maharajah, with a modern reception-room. It is the seat of a British Resident, and has considerable trade with Tibet. Pop. about 80,000.

Khaya, a genus of trees of the ord. Meliaceæ, consisting of only one or two species. *K. senegalensis*, a native of Senegambia, yields a valuable timber resembling mahogany, and its bark is used as a fever remedy.

Khedive (ke-dēv'), a word from the Persian, signifying *Prince*, the title of the rulers of Egypt, originally granted by a firman from the Sultan in 1867 to Ismail Pasha, then *Vali* or Viceroy of Egypt. The title existed till 1914, when after the deposition of the last Khedive, Abbas Hilmi, his successor received the title of Sultan.

Kherson (her'son), or **Cherson**, a maritime government of Southern Russia; area, 27,337 sq. miles; pop. 3,806,900. Almost the whole surface is one uninterrupted steppe, covered with long grass, and in many parts strongly impregnated with saltpetre. It is watered by the Dnieper, the Dniester, and the Bug. Agriculture is in a defective state, but considerable attention is paid to the cultivation of vegetables and fruit. The bulk of the trade is carried on by its port of Odessa.

Kherson, the capital of the above province, an extensive town on the right bank of the Dnieper, about 15 miles above its estuary, was formerly a very important town; but its trade was absorbed by Odessa, and Nicolaiev, with its growing dockyards, 40 miles distant. Tallow-melting, rope-making, and wool-washing are still extensively carried on. Pop. 98,540.

Khiva (hā'vā), or **Chiva**, a khanate of Central

Asia, forming part of Turkestan. It formerly occupied a large area on either side of the Amu-Darya or Oxus, but since the cession to Russia, in 1873, of its territory on the east of the Amu, it is now confined to the west side of this river. It is of a triangular shape, each of its three sides—of which the Amu forms one—being about 300 miles in length. One of its angles rests on the Sea of Aral. A great part of the surface consists of deserts, thinly inhabited or uninhabitable; but along the Amu the land consists of rich alluvial loam of the greatest natural fertility, assisted by irrigation, and securing luxuriant crops of grain, cotton, madder, fruit (including the vine), and vegetables. The winter is neither very severe nor prolonged, but the summer is very hot. Manufactures are very unimportant. Before the outbreak of the European War trade was being rapidly developed by Russian influence, especially by the Transcaspian Railway from the Caspian to Samarkand. A Soviet government was established at Khiva in 1921. The total population is estimated at 646,000.

Khiva, the capital of the above khanate, lies on an alluvial plain at the junction of two canals, 50 miles west of the left bank of the Amu. It forms an irregular circuit of about 4 miles, and is enclosed by a dry ditch and an earthen wall about 20 feet in height and thickness, and entered by twelve gates, the masonry of which is of brick. Among the principal buildings are two palaces of the khan, a number of mosques, and the castles of the principal state officers. Pop. about 6000.

Khol (ho'i), a town of Persia, province of Azerbaijan. During the European War Khol was occupied by the Russians and afterwards by the Turks, who evacuated the town after the signing of the armistice on 30th Oct., 1918. Pop. about 25,000.

Khoja, or **Khaja**, name of a Mahomedan sect of India which migrated from Persia. The Aga Khan was at one time their *Imam*. They were converted from Hinduism about 400 years ago, and, as Ismaili Mahomedans, they are heterodox Shi'ahs.

Khojend, or **Khojent**, a town in Turkestan, but formerly in the khanate of Khokand, on the Bokhara frontier. It stands on elevated ground, and was fortified by the Russians. It was formerly of much commercial importance. Pop. 40,235.

Khokand, or **Kokan**, formerly an independent khanate of Central Asia, but since 1876 forming the province of Ferghāna in Russian Turkestan. Its present area is 25,650 sq. miles, generally mountainous. It is traversed from east to west by the Sir Daria, which receives all its drainage. The summer is excessively hot,

the winter cold, but dry. Cattle raising is the chief source of wealth, but heavy crops of grain and fruit are also produced. The manufactures consist chiefly of silk and cotton goods.

Khokand, the capital of the above province, is situated on both sides of the Sir. It manufactures silk and cotton fabrics, and is the centre of a large trade, ranking next in importance and size to Tashkent in this region. Pop. 118,854.

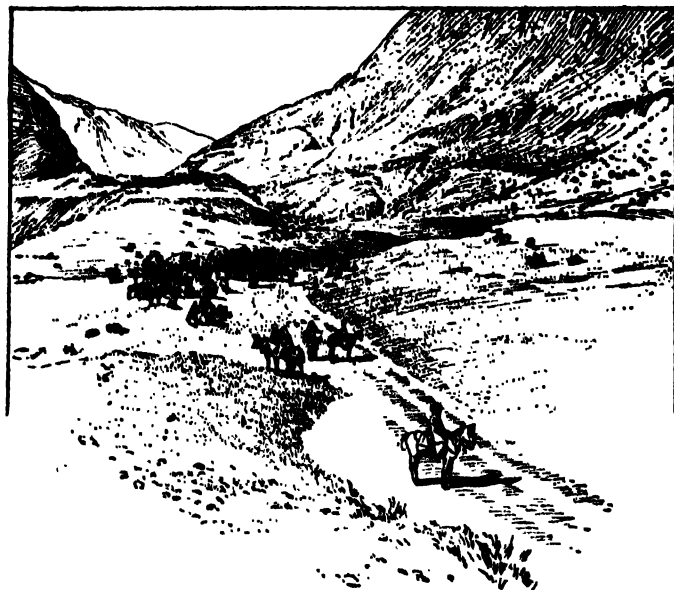
Khorasan (*ko-rä-sin'*), a province of Persia, bordering on Afghanistan; area, about 150,000 sq. miles; pop. estimated at 1,000,000. Much of the surface consists of deserts, but there are also fertile districts producing crops of cotton, hemp, and aromatic and medicinal herbs. The most valuable mineral is the turquoise from the ancient mines of Nishapur. The principal manufactures are silk and woollen stuffs, carpets, small-arms, and sword-blades. About two-thirds of the inhabitants are Persians proper; the remainder are chiefly Turcomans and Kurds. Capital, Meshed. During the European War British troops policed this end of the Trans-

Khotin (*hō'tin*), or Choczim, a town of Roumania, in Bessarabia, on the Dniester, near the Austrian frontier. It figured much in the wars of the Poles, Austrians, Turks, and Russians. Pop. 19,561.

Khurja (*khōr'ja*), a town and important railway junction of India, United Provinces, with a fine Jain temple and other good buildings, and a flourishing trade in cotton. Pop. 27,887.

Khuzistan (*hy-zis-tān'*), or Arabistan, a province of Persia, bounded on the south by the Persian Gulf, and on the west by Asiatic Turkey; area, 39,000 sq. miles, watered by the Karun and other streams; pop. estimated at half a million. In the south there are some extremely fertile plains, producing crops of rice, cotton, tobacco, indigo, silk, and grain. The interior and north are mountainous, and flocks and herds maintain their inhabitants. Trade is chiefly carried on with Bagdad and Bussorah. Dizful, Shuster, and Mohammerah are the chief towns.

Khyber (*khi'ber*), a famous mountain pass between India and Afghanistan, the chief gate to Afghanistan from Peshawar, and by means of which India has been invaded from time to time. It was the scene of severe fighting in the Afghan War. Its position renders it of great strategic importance to India, and it is now under the jurisdiction of the North-West (Frontier) Province. The pass is about 35 miles long, very narrow in parts, and its summit is 3373 feet above sea-level. On either side precipices rise up from 600 to 1300 feet in height. In order to promote peace in the North-West Frontier by strengthening the powers of defence against incursion, a railway has been built from Peshawar to the frontier fort of Landi Kotal, passing through Jamrud. It is a broad-gauge track, and



Scene in the Khyber Pass

caspian Railway and built a road, barracks, and cold-storage houses. It was evacuated in 1920.

Khotan, or Ichi, a town and oasis in Eastern Turkestan, near the confluence of the Rivers Karakash and Khotan. It was visited by Marco Polo in 1274, and explorations were started here in 1895 by Sven Hedin. During 1913-6 Buddhist shrines were discovered in the vicinity. Pop. 26,000.

passes through eight or nine tunnels. The construction of this line makes the reinforcement of garrisons and the defence of the Indian exit of the Khyber Pass so much easier that the Pass itself will lose much of its importance as an open gateway to India for all the hill tribes of the north.

Khyerpur, or Khairpur (*khi'r-pōr'*), a town of India, in Sind, 15 miles east of the Indus,

capital of a small state of the same name. Pop. about 14,000.

Khyrabad (khl-rā-bād'), a town of India, in Oudh, with numerous mosques and Hindu temples, and large fairs. Pop. 14,000.

Kiakhta (ki-āh'tā), a town of Siberia, province of Transbaikalia, about 95 miles s. of Lake Baikal, on the Russian-Chinese frontier, adjoining Troitskosavsk (Russia) and Maimachin (China). It formerly monopolized the overland trade between Russia and China, but declined after the Treaty of Peking (1860). Pop. 23,000.

Kiang-si, a province of China; area, 69,480 sq. miles; estimated pop. 16,255,000. It is profusely watered by numerous streams, and the greatest portion of the soil is highly productive, especially in rice and sugar. The province manufactures paper, cotton, and silk goods, and is celebrated for its porcelain. Its capital is Nanchang, and the treaty port Kiu-Kiang, opened in 1861, is in this province.

Kiang-su, a maritime province of China, traversed by the Grand Canal, and watered in its southern part by the Yangtze-kiang. Kiang-su was once traversed by the Hoang-Ho (Yellow River), but in 1852 the river found a new course farther to the north, and only the old water-course now traverses the province; area, 40,000 sq. miles (approximately); pop. (estimated), 20,000,000. The capital, Nanking, was once the seat of government of Southern China, and is now, with Shanghai, the chief port of the province. Other important towns are Chin-Kiang and Suchau, a treaty port. Tea, rice, cotton, and some of the finest silk in the world are produced.

Kiaochow, or **Kiau-Chau**, on bay of same name, a territory on the east coast of the Chinese province of Shantung; area, 200 sq. miles; pop. 230,000. Kiaochow was seized by Germany in 1897, and the lower harbour and district were transferred to the Germans on a ninety-nine years' lease in 1898, forming a protectorate of the German Empire until captured by Anglo-Japanese forces in Nov., 1914. The chief town and port is Tsingtao, where there is a floating dock and a railway running inland to Tsinan, a distance of 277 miles. The territory was finally returned to China in November, 1922. Silk is manufactured and cereals are raised, the chief exports being ground-nut, bean-oil, tobacco, and Shantung pongees. The standard of currency is the Mexican dollar.

Kidd, William, privateer and pirate, known as **Captain Kidd**, stated to have been born at Greenock, Scotland, in 1650, was hanged at Execution Dock, London, 23rd May, 1701. In 1696 he became captain of a ship, the *Adventure Galley*, a thirty-gun vessel, fitted out by Lord

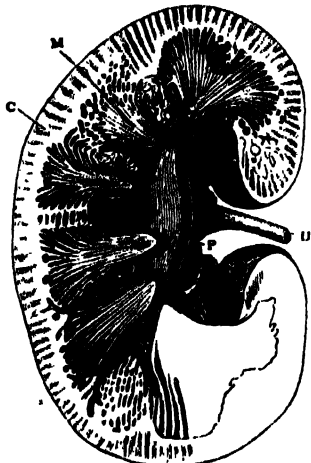
Bellomont for William III and the Government to suppress piracy, Captain Kidd being granted letters of marque and a special commission to harass all Frenchmen. He sailed in May, 1696, and commissioned his ship fully at New York, proceeding to Madagascar, where he became a pirate himself. He was arrested in Boston in 1698, and returned to England for trial on a charge of piracy and of murdering one of his crew, two of his shipmates having turned king's evidence. He is supposed to have buried immense treasure in Long Island Sound or on the banks of the Hudson River, but nothing has ever been located.—Cf. W. W. Campbell, *An Historical Sketch of Robin Hood and Captain Kidd*.

Kidderminster, a municipal borough and market town of England, county Worcester, on the banks of the Stour. Kidderminster is famed for the manufacture of carpets. The industry dates from 1730, and Kidderminster carpets are said to have become famous from the durability of their colour, a result obtained by using the water of the River Stour, which contains iron and fuller's-earth. Cloth was also manufactured, but the industry appears to have declined from the eighteenth century with the introduction of machinery. There is a grammar school, founded in 1637, and a statue to Sir Rowland Hill, who was a native of the town. From 1882 to 1918 Kidderminster returned one member to the House of Commons. It gives name to a parliamentary division of the county. Pop. (1921), 27,122.

Kidnapping, the act of getting forcible and illegal possession of the person, an offence of varied degree, but always punishable by fine or imprisonment. In its more modern and limited sense it is applied to the obtaining of slaves or native labour by force, as practised by the Arabs in Africa. In Great Britain this term was sometimes applied to the impressment recruiting for the army and navy.

Kidneys, two of the abdominal viscera, in the form of two glands, the function of which is to secrete the urine from the blood. They are situated one on each side of the vertebral column at the back part of the abdominal cavity on a level with the last dorsal and two upper lumbar vertebrae. The right kidney lies at a slightly lower level than the left. They are of the well-known 'kidney-bean' shape. The concave side of each kidney is turned inwards and towards the spine. The depression on the inner side is termed the *hilum*, and from this notch the excretory duct or *ureter* proceeds, whilst the blood-vessels of the kidney enter and leave the gland at this point. The weight of each male kidney is about 5 oz., those of the female weigh each somewhat less. Each gland is covered by a thin sheath of fibrous tissue, which has no

extension into the substance of the organ. The internal substance is divided into an outer deeper-coloured *cortical* portion or *cortex*, and an inner



Section of Kidney

C, Cortical portion. M, Medullary portion.
P, Pelvis. U, Ureter.

lighter-coloured or *medullary* portion. Both portions consist of tubes (*tubuli uriniferi*), which run a very tortuous course in the cortex, but continue as straight tubes in the medulla. The latter is formed into a series of conical fleshy masses, about twelve in number, called *pyramids of Malpighi*. These project into a cavity formed at the hilum by the expansion of the excretory duct, and called the *pelvis* of the kidney. Prolongations of the pelvis, called the *calyces*, invest the apices of the pyramids and dip in between them like funnel-shaped tubes. Now in the cortex the end of a tubule is dilated into a sac or capsule; into this a small branch of the renal artery enters, and then breaks up into a tuft of capillary blood-vessels. This tuft is called the *glomerulus*, and it and its capsule form a *Malpighian corpuscle*, about $\frac{1}{10}$ th of an inch in diameter; so that a tubule, beginning at its dilated end, runs a tortuous course in the cortex, reaching the medulla becomes straight, and finally opens into the pelvis on the apex of a pyramid. The blood-vessels of the kidney consist of the *renal artery*, derived from the aorta, and the *renal vein*. The branches of the artery enter the gland at the hilum, and pass into the substance of the gland between the papillæ. Finally they reach the cortical portion, and therein subdivide into the minute vessels which form the *glomeruli* of the Malpighian bodies. The renal veins leave the kidney also at the hilum, and pour their contents into the great main vein of the lower parts of the body (*vena*

cava inferior). The nervous supply of the kidney is derived from the renal plexus, and from the solar plexus or large sympathetic mass of the abdomen. The separation from the blood of the constituents of the *urine* is accomplished in the *glomeruli*, and by the *uriniferous tubules*, the former straining off the watery parts of the blood, whilst the latter remove the more solid matters. Gradually the secreted urine passes through the tubules, into the *pelvis* of the kidney, thence into the *ureters*, which in turn open into the bladder behind its orifice or neck. The urine is constantly entering the bladder drop by drop.

Inflammation of the kidneys is known as *nephritis*. Occasionally concretions of substances precipitated from the urine accumulate in the kidney to form renal calculi (stones in the kidney), and cause, in their passage through the ureter, most excruciating pain.

Kidney-vetch, *Anthyllis*, a genus of plants, nat. ord. Leguminosæ. There are many species, both shrubby and herbaceous, but the only one found in Great Britain, chiefly on calcareous soils, is the *Anthyllis vulneraria*, commonly called Lady's Fingers, with pinnate unequal leaves, and



Kidney-vetch (*Anthyllis vulneraria*)

heads of flowers generally yellow, sometimes graduating towards scarlet.

Kidwelly, an ancient municipal borough and seaport of Wales, in Carmarthenshire, on the River Gwendraeth, near its mouth in Carmarthen Bay. It has an interesting old castle, ancient

church, works for lime and tin, collieries, and a good harbour. Pop. 3181.

Kiel (kēl), a town of Germany (Prussia), in Schleswig-Holstein, beautifully situated on a deep bay of the Baltic, 54 miles north by east of Hamburg. The most notable buildings are the university, founded in 1665, and a sixteenth-century palace. Until 1919 Kiel was a fortified naval port of Germany, with an imperial dock-yard, and a station of the greater part of the imperial fleet. Enormous sums were spent by the German Government upon the docks and shipbuilding yards, and Kiel was converted into a great naval arsenal. The activity ceased in 1918, when Germany was compelled to surrender her fleet to the Allies. Pop. (1919), 205,380.

Kiel Canal, or Kaiser-Wilhelm Canal, a ship canal, 60 miles long, 36 feet deep, traversing Schleswig-Holstein, from Brunsbüttel to Kiel harbour. Construction begun, June, 1887; opened, June, 1895; deepening and widening begun, 1908; re-opened, 1914. The canal is electrically lighted, and may be navigated at night. Formerly a State water-way, Kiel is now (since 1919) open to international traffic, and is a commercial time-saver, linking up the North Sea directly with the Baltic.

Kielce (ki-el'tse), the smallest government of Poland; area, 3900 sq. miles; pop. 1,000,000. It is watered by tributaries of the Vistula, and partly covered by effects of the Carpathians.—The capital, *Kielce*, is an ancient town about 50 miles north-east of Cracow. During the European War the battle of Kielce, between the Russians and the Austrians, was fought on the 3rd Nov., 1914. Pop. 44,000.

Kierkegaard, Søren Aaby, Danish philosopher, born 5th May, 1813, at Copenhagen, died there 11th Nov., 1855. The majority of his works were published under pseudonyms, and the most important are: *Enten-Eller* (Either-Or), *Stages of Life*, and *On Christian Training*. Kierkegaard's influence upon Danish and Norwegian thought was very considerable.

Kieserite (kē'zēr-it), $MgSO_4 \cdot H_2O$, a hydrated magnesium sulphate, obtained at Stassfurt, and now employed as a source of epsom salt, and in the manufacture of manures. Mixed with quicklime and water it hardens into a mass which, after heating, pulverizing, and again mixing with water, becomes of a marble-like consistency, and may be made into ornamental articles.

Kiev (ki-ev'), or Kieff (ki-ef'), a government of s.w. Russia, in the Ukraine; area, 19,876 sq. miles; pop. 5,000,000. The surface is in general flat, intersected occasionally by hills of moderate elevation along the course of the Dnieper and other streams. The Dnieper is the only stream navigable to any extent. The climate is mild,

the summer very hot and dry. Before the outbreak of the European War, and till the Revolution of 1917, the province was the centre of the beet-sugar industry in Russia.

Kiev, the capital of the above government, is situated on the right bank of the Dnieper, crossed by a suspension bridge, at one time the finest in Europe. Kiev really consists of three towns, Podot, Old Kiev, and Pecherak, all more or less fortified. Connection by rail with Odessa and Kursk did much to stimulate the trade of the town. Kiev is supposed to have been founded in the fifth century A.D., possesses a beautiful eleventh-century cathedral and a university, founded in 1588, and transferred from Vilna to Kiev in 1833. It was occupied by the Germans in 1916-7, and after the Russian Revolution the town changed hands several times. It was captured by the Bolsheviks in 1917, by Petlura in 1919, by the Poles in May, 1920, and soon afterwards again by the Soviet Government. Pop. 610,100. See *Ukraine*.

Kifri, a village of Mesopotamia, 108 miles N.E. of Bagdad. During the British campaign in Mesopotamia, under General Marshall, Kifri was captured by the British in April, 1918. Seized by an Arab rebel force, it was retaken by the British in 1920.

Kilda, St., a small and rocky island in the Atlantic Ocean, belonging to Scotland, 40 miles north-west from the north-west extremity of the island of North Uist. It is about 3 miles long by 2 miles broad, a great portion of its sea-front being composed of perpendicular precipices, which in some parts rise to a height of many hundred feet. The only hamlet lies at the head of East Bay, and contains some thirty houses of modern construction. In the interior there is sufficient pasture for a limited number of cows and sheep; patches of potatoes, oats, and here are grown, and, together with fish and sea-fowl, supply the inhabitants with food. In bad seasons the lot of the inhabitants—about seventy in number and Gaelic-speaking—has often been one of privation, but more regular intercourse with, and philanthropic aid from the mainland, have much improved their domestic comfort, and religion and education are also adequately provided for. In the summer months the island is now frequently visited by tourists.

Kildare', an inland county of Ireland, in the province of Leinster; length, 40 miles; breadth, 27 miles; area, 418,645 acres. The surface is flat, or gently undulating, the soil mostly a rich loam. Oats, potatoes, barley, and turnips are the principal crops. The manufacture of woollens is carried on to some extent, but the chief occupations are agricultural. Principal rivers: Barrow, Liffey, and Boyne. Chief towns: Naas (the county town), Athy, and Newbridge.

In 1918 Kildare returned two members to the Imperial Parliament. Pop. 66,627.

Kildare, town of above county, reputed to have originated in the religious community founded by St. Brigid (A.D. 490). The cathedral, described by Cogitosus (9th century), and burned by the Danes in 1050 and 1067, was rebuilt in 1875. A round tower, 105 feet high, adjoins the cathedral, and a castle erected by De Vesci (13th century) occupies the site of one founded by Strongbow in 1169. There are also traces of an ancient Carmelite monastery. Contiguous to Kildare is the "Carrugh of Kildare", formerly the Aldershot of Ireland, and equally reputable as an Irish racing centre. Pop. 3000.

Kil'ia, a town of Roumania, in Bessarabia, on the branch of the Danube delta to which it gives its name. Pop. 10,874.

Kil'manjaro (The Great Mountain), the highest mountain in the African continent, situated in Tanganyika territory, forming one of the boundary-marks between Tanganyika and Kenya Colony. It has two extinct volcanic peaks, Kibo (19,000 feet) and Kinawenzi (17,000 feet), which are 7 miles apart and are connected by a saddle (14,000 feet). Kibo is snow-capped and has many glaciers. At its summit there is a crater some 650 feet deep and 6500 feet in diameter. Kinawenzi has no permanent snowcap. Kibo was climbed by Captain Johannis in 1902.

Kilkenny, a county of Ireland, in the province of Leinster, has an area of 796 sq. miles. The surface is generally level. The principal rivers are the Barrow, Nore, and Suir. The soil is for the most part light and dry, some valleys being extremely fertile, and dairying is carried on extensively. The chief crops are wheat, oats, barley, potatoes, and turnips. Beds of fine black marble are quarried near the town of Kilkenny, and anthracite coal is raised chiefly for local consumption. In 1918 Kilkenny County returned two members to the Imperial Parliament. Pop. 75,000.

Kilkenny, a city of Ireland, county town of Kilkenny County, 78 miles s.w. of Dublin, delightfully situated on both sides of the Nore. The manufacture of coarse woollens, brewing, and the working of Kilkenny black and foreign marbles into chimney-pieces, monuments, &c., form the chief industries of the town. Pop. 10,514.

Killar'ney, a market town of Ireland, in the county of Kerry, in the midst of beautiful scenery, within a mile of the celebrated lakes to which it gives its name. These lakes are three in number, the lower $4\frac{1}{2}$ miles long by 2 miles broad, the middle $1\frac{1}{2}$ miles long and $\frac{1}{2}$ mile broad, the upper 3 miles long. They are interspersed with wooded islands, and the lofty banks are also richly wooded. Pop. 8200.

Killdeer (*Ægialitis vociferus*), a variety of plover, common in America, and so called from its plaintive cry.

Killiecrankie, a pass of Scotland, in the Grampians of northern Perthshire, above the River Garry, and on the Highland Railway. Here Claverhouse, Viscount Dundee, defeated the forces of William III under Mackay in 1689, but was killed in the moment of victory.

Kilmain'ham, a western suburb of Dublin, Ireland, between the Liffey and the Grand Canal. It is chiefly known for its Royal Hospital, founded in 1675, and its county jail. The Kilmainham Treaty (April, 1882) was an informal arrangement made between Gladstone and Parnell, by which the Irish leader, who was then a prisoner at Kilmainham, was released after promising to exert his influence against the commission of agrarian crime in Ireland.

Kilmarnock, a municipal and police burgh of Scotland, Ayrshire, 19 miles s.w. of Glasgow. It is one of the principal market towns of Scotland, and is an important railway junction on the Midland route between London, Carlisle, and Glasgow, situated upon the Glasgow and South-Western Railway, which has extensive locomotive-works in the vicinity. Kilmarnock contains the Dairy School for Scotland. The town was intimately associated with Robert Burns, and many MSS. are preserved in the Burns Memorial (Kay Park). There are three parks (Kay, Dean, and Howard), many good buildings, and extensive boot-factories and engineering-shops. The Cheese Show of Scotland is held at Kilmarnock yearly, and is a very important Scottish agricultural event. Pop. (1921), 35,750.

Kilsyth, a town and police burgh of Scotland, in Stirlingshire, 12 miles n.e. of Glasgow. The inhabitants are employed in iron- and coal-mining. The battle of Kilsyth was fought on 15th Aug., 1645, between the Covenanters and the forces of Montrose, and ended in a victory for the latter. Pop. 7600.

Kilwin'ning, a police burgh of Scotland, Ayrshire. It is 24 miles s.w. of Glasgow, stands on an important junction of the Glasgow and South-Western Railway, and has also a station on the Caledonian Railway. It has ruins of an abbey, founded in 1140, which was dedicated to St. Winnin and ultimately gave its name to the town. The annual ceremony of the shooting at the popinjay, described in Scott's *Old Mortality*, was held at Kilwinning until 1870. Eglinton Castle, the seat of the Earls of Eglinton, formerly at Ardrossan, is in the vicinity. The town is the birth-place of Scottish Freemasonry. Pop. 5404.

Kim'berley, a city of Cape Province, capital of Griqualand West, and centre of the diamond-

mining industry of that district. It lies about 600 miles N.E. of Cape Town, with which it has a railway connection, and stands on an open plain some 4000 feet above sea-level. There is a theatre, two cathedrals, and many other fine buildings. The diamond-mines are grouped under De Beer's Consolidated Mines, and are four in number—Kimberley, Du Toit's Pan, De Beer's, and Bultfontein. These mines are fenced in with barbed wire, as are also the compounds wherein the native workers are confined while employed in the mines, a necessary precaution against illicit diamond buying and trading. The white workers live in a specially constructed village on the outskirts of Kimberley. The town was first established by pioneers in 1870, who found diamonds and camped on the spot. In 1871 the mines were taken under the protection of Britain, and the town was named after the Earl of Kimberley, then Secretary of State for the Colonies. De Beer's Consolidated Mines purchased the entire rights in 1889. In 1899, when war broke out, Kimberley, then defended by a garrison of the regular army, was attacked by the Boers, and was besieged, being relieved by General (afterwards Lord) French and a cavalry division on 15th Feb., 1900. The mines were closed in 1914 and reopened in 1916. Pop. (approximately), 60,000, including 10,000 whites.

Kimberley, a northern district of Western Australia, brought into notice by the discovery of gold-fields in 1886. It contains immense tracts of splendid pasture, and much land suitable for stock, wheat, sugar, and tobacco. The chief port for the district is Derby, on the Fitzroy River.

Kimchi (kim'hē), David, generally quoted by his initials RADAK (Rabbi David Kimchi), one of the most famous Jewish rabbis of the Middle Ages, born towards the end of the twelfth century at Narbonne, died 1240. He wrote commentaries on almost all the books of the Old Testament, and rendered essential service to Hebrew literature by the composition of his *Grammar* and *Dictionary of Hebrew Roots*. His father Joseph and his brother Moses also distinguished themselves as Hebrew scholars and theologians.

Kimmeridge Clay, a bluish slaty clay, containing some carbonate and sulphate of lime, found in thick deposits in the south of England (Kimmeridge in Dorsetshire) and the north of France. It is a member of the Upper Oolite.

Kimpolung, (1) a town of Roumania, in the Bukovina, formerly in Austria; situated on the Moldava. Pop. 5584. (2) A town of Wallachia, the ancient capital of the principality, situated in a valley at the foot of the Carpathians, 80 miles N.W. of Bukarest. Pop. 10,000.

Kincardineshire, or The Mearns, a mari-

time county on the east coast of Scotland; area, 244,482 acres. About half the county consists of cultivated land, woodland, improvable moor, &c. The Grampian Mountains, by which it is traversed north-east to south-west, occupy a large portion of its surface, their highest summit within the county being Battock (2555 feet). The principal rivers are the North Esk, Bervie, Carron, Cowie, and Dee. The most fertile portion is the Howe of the Mearns, part of the Strathmore valley, between the Grampians and a range of low coast hills. The principal crops are oats, barley, wheat, turnips, and potatoes. Stonehaven is the county town. Pop. 41,779.

Kinchinjunga, a five-peaked mountain of the Himalaya, the third highest in the world (28,146 feet), lying on the Nepal-Sikkim frontier.

Kin'dergarten was the name given by Friedrich Froebel in 1840 to his Nursery School for Little Children, which he describes as "an institution for fostering family life"—"an institution for the self-teaching, self-education, and self-culture of men by means of play, of creative original activity, and of voluntary self-instruction".

In instituting and developing his kindergarten Froebel appealed to women—in the first place to the mothers; and he worked out a plan for the training of women in the care of children—nurses, nursery governesses, and kindergarten mistresses—as well as superintendents of both sexes for crèches, playgrounds, and infant schools.

The purpose of the kindergarten, as stated by its founder, is the awakening of the bodily and mental powers—"so that every child, no matter of what rank or condition, may here be able to work out and faithfully express his real nature, character, and true vocation in life; educating himself as well as being educated".

The means chosen to realize this purpose were:

1. *Songs and Games and Simple Gymnastic Exercises*.—The *Songs for Mothers and Nursery Songs* (Mutter und Kose Lieder) were adapted by Froebel for the use of the mother with her own tiny children, many of them having their origin in the simple folk ditties of his country. Many of the games were adaptations of those which children habitually played or which mothers played with their babies.

2. *Educational Toys* which, apart from the symbolic value which Froebel placed upon them, were well adapted to assist the unfolding of childish powers. These toys are known as Froebel's 'Gifts'.

Gift I consists of six wooden balls—red, blue, yellow, purple, green, and orange—each with its own woollen string.

Gift II consisted at first of a wooden ball and cube, to which was later added the wooden cylinder with which Froebel intended to illustrate one of his favourite laws—that of 'the reconciliation of opposites'.

Gift III was a 2-inch cube divided into eight cubes of 1 inch.

Gift IV was a similar cube divided into eight oblong bricks.

Gift V was an enlargement and elaboration of *Gift III*, and contained 27 1-inch cubes, some of which were divided into half-cubes and some into quarter-cubes.

Gift VI was in the same way an elaboration of *Gift IV*.

Gift VII consists of coloured tablets for making patterns.

Gift VIII consists of sticks and thin strips of wood and metal rings, which were used for outlining objects or patterns.

Gift IX consists of beads for threading and peas or pebbles.

The Gifts were intended to be used as individual employment and mainly for free play—that a child might through 'creative self-activity' express himself, and also make acquaintance with mathematical and other ideas.

3. *Materials for Educational Handwork*, known as 'Occupations'. These consisted of:

- (a) Plastic material, such as sand and clay.
- (b) Material for more permanent constructions, such as paper for folding, twisting, and cutting, and interweaving or 'mat-plaiting'.
- (c) Drawing, pricking, sewing, and writing on chequered paper.

4. *Nature Study*.—This was considered by Froebel a very important factor in the education of a child, as leading him to understand and reverence life and God. He wished children to live amid the life of nature, to recognize the care of birds and other animals for their young, and from this to understand something of the love of parents and of God. He desired to have all children trained to tend growing plants, and thus to satisfy their love of digging and watering, and to give them the joy of helping other life in the simple way that they could understand.

5. *The Telling of Stories*.—Though the story is generally given an important place in a modern kindergarten, Froebel does not emphasize this in his plans for the youngest children. Very simple tales and rhymes in connection with momentary needs and interests are all that the child's craving for physical activity will allow.

History of the Kindergarten.—The first kindergarten was opened in 1837 in the village of Blankenberg, near the hamlet of Keilhau, in the Thuringian Forest, where Froebel had, twenty years previously, established a school for boys of all ages. In 1839 Froebel and his chief helper of early days, Middendorf, founded in Dresden an Institution for the Care of Little Children, and a similar kindergarten school in 1840 in Frankfurt; and many others were instituted later in various parts of Germany. In 1850 he received from the Duke of Meiningen his country seat of Marienthal to accommodate a new Training College for Kindergarten Teachers. In Aug., 1851, an entire prohibition of the Kindergarten in Prussia was issued by the Education Minister von Raumer, on the grounds

that they were revolutionary, atheistic, and socialistic; and Bavaria in the same year ordered the closing of all kindergartens except those which were attached to the orthodox Protestant churches. The cruel misinterpretation of his aims and his work was a blow from which Froebel was unable to recover, and he lived only until the following June.

In England the first kindergarten of any importance was opened by Madame Ronge at 82 Tavistock Place, London. Madame Ronge also lectured in Manchester, and the outcome of her lectures was the foundation of the Manchester Kindergarten Association, the oldest kindergarten association in England.

The Froebel Educational Institute in West Kensington, which has ever since been known as the largest and most important kindergarten training college, was founded in 1894. It consisted of a training college for students, with a demonstration school built as a wing of the main block. In response to the strong desire of its principal for a kindergarten for quite poor children, and largely through the generosity of Mr. Claude Montefiore, a low-fee demonstration school was opened by the Institute a few years later, but its status was raised when a real 'free kindergarten' or 'nursery school' was started by voluntary contributions in Notting Dale, and called the Michaelis Free Kindergarten, enabling its workers to carry out in the fullest sense Froebel's motto "Let us live with our children".

The work of modern kindergartens has fully justified Froebel's conceptions of the absolute need for freedom in development through accepting what is best in the environment, building it up into the growing organism, and using it in creative work. Froebelians have never hesitated to study modern educational developments in theory and practice, and to adapt to their needs what they find to be good in them. This has led to the abandonment of some of Froebel's material, and to a modified use of the rest. Yet the spirit of Froebel, the willingness to study little children and to 'follow' in order to help and guide them, is still seen in every true kindergarten.—Cf. E. R. Murray, *A Story of Infant Schools and Kindergartens*.

Kinematics is the mathematics of motion. It is that part of *kinetics* (q.v.) which is independent of the ideas of *mass* and *force*. It has been termed 'the geometry of motion', but while geometry deals with space only, kinematics takes account also of the element of time. Intermediate between geometry and kinematics stands the theory of displacement, or change of position, more especially change of position of points and rigid bodies. For the theory of displacements in the case of non-rigid bodies, see *Elasticity* and *Hydrodynamics*. Displacement-

theory may be regarded as a branch of geometry since it excludes the idea of *time*.

The displacement of a point is a *vector*, and its theory is simply the geometry of *vectors* (q.v.). The theory of displacement of rigid bodies is comparatively modern. Michel Chasles (1793–1880) first stated the fundamental proposition for the displacement of a rigid plane body in its own plane, viz. that in general one point of the body (or of a rigid extension of it) retains its original position (is *latent*), so that the displacement could be accomplished by a rotation about that point, which is called the ‘centre of displacement’, or ‘centroid’. The exceptional case of *translation*, in which every straight line in the body remains parallel to its original position, may be viewed as a case of an infinitesimal rotation about an infinitely distant centroid.

The corresponding theorem for the case of a rigid solid displaced in space is that in general one straight line in the body (or in a rigid extension of it) remains in the same straight line after displacement, but displaced along that line, while the body has rotated about the line; that is to say, the displacement can be accomplished by a ‘screw motion’. This includes the special cases (1) pure translation (without rotation), and (2) rotation about a fixed axis. From these fundamental theorems we can deduce that any continuous motion of a rigid plane body in a plane is equivalent to a rolling motion of the ‘body centrode’ on the ‘space centrode’, the former being the locus in the body of successive positions of the centroids of the successive infinitesimal displacements, and the latter the corresponding locus in the plane of reference. This construction for relative motion of two plane bodies, such as parts of a machine, constrained to move in the same plane (or in parallel planes) was much employed by F. Reuleaux in his treatise mentioned below.

The corresponding proposition in three-dimensional space is that the relative motion of two rigid bodies is equivalent to the combined rolling and sliding of two ruled surfaces on each other, one being fixed in each body.

Closely connected with this is the theory of the relative displacements of a set of rigid bodies connected with one another by constraints of various kinds, and the calculation of ‘degrees of freedom’ of any body so connected, also the theory of ‘geometrical constraints’, viz. such as are exactly sufficient to restrict the motion of a rigid body to any required extent. (Cf. Kelvin and Tait’s *Natural Philosophy*, Arts. 195–202.) A plane rigid body moving in a plane has *three* freedoms, which can be reduced to *two* by constraining one of its points to remain on a fixed curve, or to *one* by fixing one of its points. A rigid body in space has *six* freedoms, which

might be taken as consisting of the four freedoms of a straight line (the screw-axis), the *pitch* of the screw, and the amount of rotation about the axis.

Kinematics proper, involving the idea of *time* and the derived conceptions of *velocity* and *acceleration*, both linear and angular, has several branches, according as it deals with points or rigid bodies, or non-rigid bodies, and according as one, two, three, or more dimensions of space are postulated. In one-dimensional motion of a point, if x be the distance of the moving point P from a fixed origin O, at time t , then $\frac{dx}{dt}$ measures the instantaneous speed of P, and $\frac{d^2x}{dt^2}$ its acceleration (see *Maclaurin’s Theorem*).

Amongst the most important motions of this sort are *uniformly accelerated* and *harmonic* (simple) motions. (See *Kinetics*; *Harmonic Motion*.)

For the motion of a point in a plane (space of two dimensions) two co-ordinates, which may be the rectangulars (x, y) or the polars (r, θ), are required to specify the position of P at time t . The velocity-components in the former case are $\frac{dx}{dt}$, $\frac{dy}{dt}$, and the acceleration-components $\frac{d^2x}{dt^2}$ and $\frac{d^2y}{dt^2}$. In the latter case the velocity-components along and perpendicular to the radius vector are $\frac{dr}{dt}$, $r\frac{d\theta}{dt}$ respectively, and the acceleration-components $\frac{d^2r}{dt^2} - r\left(\frac{d\theta}{dt}\right)^2$ and $r\frac{d}{dt}\left(\frac{d\theta}{dt}\right)$. The tangential and normal accelera-

tions are $\frac{v^2}{\rho}$ and v^3/ρ , where v is the velocity, and ρ the radius of curvature of the path. A case of special importance is the motion of a point when the acceleration at every instant is directed towards a fixed point. In this case $r\frac{d^2\theta}{dt^2}$, which measures twice the rate at which

the radius vector sweeps out area, is constant, a theorem which, with its converse, was stated by Newton.

The velocity and acceleration of a moving point can also be investigated geometrically by the aid of the *hodograph* (q.v.).

For motion of a point P in three-dimensional space, the usual co-ordinates for specifying the position of P at time t are (1) rectangular co-ordinates (x, y, z), or (2) polar co-ordinates (r, θ, ϕ), and here again the velocity- and acceleration-components are expressible in terms of the time-derivatives of the co-ordinates.

The motion of a plane body in a plane has

been very fully treated by G. M. Minchin (*Uniplanar Kinematics*). Such motion can be specified by stating the motion of one of its points, and the rotation of the body about that point, or alternatively by determining the space and body-centrodes, and the rate at which one rolls on the other. A construction useful in the theory of machines is the 'velocity-image' of the body at an instant. This is formed by drawing vectors from a fixed point to represent the velocities of the points of the body. The ends of these vectors form the points of another plane body, which is 'the velocity-image' of the original body, and is similar to it, but turned through 90° . The 'acceleration-image', constructed in like manner, is also similar to the original body.

The motion of a rigid solid in space of three dimensions can be specified in various ways, e.g. by specifying the motion of one of its points, and its component rotations about three rectangular axes passing through that point, and either fixed in direction or fixed in the body. For other theorems in kinematics of rigid bodies see *Kinetics*.

The kinematics of bodies in non-Euclidean space, and in space of more than three dimensions, have also been investigated by modern mathematicians. The recent theory of relativity (q.v.) has important kinematic aspects.—BIBLIOGRAPHY: Kelvin and Tait, *Natural Philosophy*; G. M. Minchin, *Uniplanar Kinematics*; F. Reuleaux, *Kinematics of Machinery*; R. Willis, *Principles of Mechanism*.

Kinetics is that branch of dynamics (q.v.) which treats of the motions of bodies in connection with the forces acting upon them. The term is of recent origin, replacing the term *dynamics*, which is now used to include *statics*. An elementary account of kinetics forms part of the article *Dynamics*, and a discussion of its fundamental ideas is given in *Newton's Laws of Motion*. That part of kinetics which is independent of the ideas of mass and force is dealt with in *Kinematics*. For the kinetics of fluids (hydrokinetics) see *Hydrodynamics*.

Dynamics of a Material Point or Particle.—Here the fundamental equation of motion is a direct translation into symbols of Newton's second law (see *Dynamics*). It may be written $ma = F$, where m is the mass of the particle, a its acceleration, and F the 'absolute measure' of the force acting; and the equation implies sameness of direction as well as equality of magnitude. According to the *parallelogram of forces* (see *Statics*), if OA and OB represent two forces acting on a particle, they are equivalent to a single force (their *resultant*) represented by the diagonal OC of the completed parallelogram $OACB$. A similar 'parallelogram law' holds good for the composition of accelerations, hence

if x, y, z are the rectangular co-ordinates of a particle referred to fixed axes, at time t , the fundamental equation gives rise to the three 'equations of motion' $m \frac{d^2x}{dt^2} = X$, $m \frac{d^2y}{dt^2} = Y$, $m \frac{d^2z}{dt^2} = Z$, where X, Y, Z are the rectangular components of F . From these equations by integration with regard to t we get, $m(x' - x'_0) = \int_0^t X dt$, and two similar equations, which express that the gain of momentum in any direction in a given interval of time is equal to the 'impulse' of the force in that direction. These 'impulse equations' are specially suitable for calculating the motion of the particle when 'impulsive' forces act, i.e. forces which produce a finite change of momentum in an infinitesimal time.

Again, by integration with respect to x , the equation $m \frac{d^2x}{dt^2} = X$, gives $\frac{1}{2}m(x'^2 - x'_0{}^2) = \int_0^t X dx$. From this and the two corresponding equations involving y and z , by addition we get

$$\begin{aligned} \frac{1}{2}m(v^2 - v_0^2) &= \int \left(X \frac{dx}{ds} + Y \frac{dy}{ds} + Z \frac{dz}{ds} \right) ds \\ &= \int F \cos \theta ds, \end{aligned}$$

where v is the velocity of the particle, s the length of path described at time t , and $F \cos \theta$ the resolute of the force in the direction of the particle's motion. This is the *equation of work*, or *energy-equation*. $\frac{1}{2}mv^2$ being the kinetic energy at time t , the equation states that "increase of kinetic energy is equal to the work done on the particle by the forces acting upon it".

If we suppress the co-ordinate z (or put it $= 0$), we get the corresponding theory for a particle moving in a plane. The kinetics of a particle moving in a plane can also be investigated by the aid of polar co-ordinates (r, θ). This is of special importance in the case of motion under a central force, including motion of a planet or comet, treated as a *particle*. For a central attractive force F , which in general will be a function of r , the origin being the centre of force, the equations of motion for components along and perpendicular to the radius vector (see *Kinematics*) are

$$m(r'' - r\theta'^2) = -F, \quad \frac{1}{r} \frac{d}{dt}(r^2\theta') = 0.$$

The latter equation, being integrated, gives $r^2\theta' = h$, a constant. It is easy to show that $r^2\theta'$ is twice the measure of the rate at which area is swept over by the radius vector. It may be shown conversely that if $r^2\theta'$ is constant

* Here, and throughout the article, dashes are used to indicate differentiation with respect to the time; so that x' stands for dx/dt , and x_0 for the initial value of dx/dt .

then the force on the particle is continually directed towards the centre. Again, if the particle moves in the ellipse whose polar equation is $r = a(1 + e \cos \theta)$, and if $r^2 \dot{\theta} = h$, we can deduce from the equations of motion that $F = \frac{h^2 m}{r^3}$,

which implies that the force on the moving particle is inversely proportional to the square of the distance of the particle from the centre of attraction. It was in this manner that Newton deduced from two of the laws of planetary motion empirically obtained from observations by Kepler, the conclusions that each planet is acted on by a force towards the sun, varying inversely with the square of its distance from the sun.

Kinetics of a System of Material Particles.—Here the third law of motion affirms that all the internal forces in the system may be analysed into pairs of equal and opposite forces exerted on each other by pairs of particles. By combining the equations of motion of all the particles, we deduce the following results:

(i) $\Sigma(mx'') = \Sigma X$, $\Sigma(my'') = \Sigma Y$, $\Sigma(mz'') = \Sigma Z$, where X , Y , Z is one of the external forces applied to the system. If $(\bar{x}, \bar{y}, \bar{z})$ is the centroid (centre of inertia), then $\bar{x} \cdot \Sigma m = \Sigma(mx)$;

and $\Sigma m = \Sigma X$, &c., which shows that if the system's centre of inertia is the centre of all the mass were concentrated at the centre of inertia and were acted on by a force parallel to the actual applied

force, $\Sigma m \ddot{x} = \Sigma X$, &c., which shows

change of moment of momentum. ΣX is equal to the algebraic sum of the applied forces about this

A theorem similar to (ii) holds good when the co-ordinate axes, instead of being fixed, move so that the origin is always at the centre of inertia their directions remaining unchanged.

(iv) $\frac{1}{2} \Sigma m(\dot{x}^2 + \dot{y}^2 + \dot{z}^2) = \int (Xdx + Ydy + Zdz) + \text{constant}$. This is the equation of energy for a system of particles.

These theorems are true whether the particles are separate or combined into solid or fluid bodies. The case when they form a rigid body is of special importance. For the important case of the rotation of a rigid body about a fixed axis we deduce, (1) $I\omega' = T$, (2) $\frac{1}{2} I\omega^2 = \text{the integral of } Td\theta$, where I is the moment of inertia (see *Inertia, Moment of*) about the axis of rotation. If the torque, or algebraic sum of moments of applied forces about that axis, ω the angular velocity, ω' the angular acceleration, and θ the angle turned through. (1) is the equation of motion, and (2) the energy equation for a rigid

body rotating about a fixed axis. It can be shown that (1) holds good not only for an axis fixed in space and in the body, but for any axis passing through its centre of inertia, and also for its instantaneous axis of rotation. When the fixed axis is horizontal and the only applied forces are gravity, and the reactions of the axis, we have the so-called 'compound pendulum' first investigated by C. Huygens.

A very general proposition in kinetics is that if for each particle we imagine a force equal and opposite to that which would be required to give it its actual acceleration supposing it were free, these fictitious forces, taken along with the actual forces on the system of particles or bodies, would satisfy the static conditions of equilibrium. (See *Statics*.) This is *D'Alembert's Principle*, and it enables us to employ the rules of statics in writing down the equations of motion. The centrifugal forces on a rotating body are fictitious forces of the kind referred to.

The preceding paragraphs are confined to the simpler applications of the laws of motion to the problems of kinetics. The case of a rigid body free to move in space, and acted on by forces, presents a more complicated problem which has exercised the powers of the greatest mathematicians. The fundamental equations referred to moving axes were given by L. Euler, and many interesting theorems have been deduced. When the body is in rotation about an axis subject to given forces or constraints, we have a *gyroscope* or *gyrostat* (q.v.).

Various axioms or principles have been put forward from time to time, to serve as the basis of dynamics, and have been applied to the study of the more general problems of kinetics. Amongst these are Maupertuis's *Principle of Least Action*; Sir W. R. Hamilton's *Principle of Varying Action*, further developed by C. G. Jacobi; and the axiom that every natural motion of an independent material system is such that the system follows with uniform velocity one of its 'straightest' paths, propounded by H. Hertz. The method of generalized co-ordinates introduced by Lagrange is employed by most of these dynamicists. Whereas these various principles are not inconsistent with Newton's system of kinetics, the 'principle of relativity' (q.v.), recently propounded by Einstein, would, if accepted, revolutionize the whole science.—BIBLIOGRAPHY: Kelvin and Tait, *Natural Philosophy*; J. Clerk Maxwell, *Matter and Motion*. Treatises on *Dynamics* by A. and J. G. Gray, H. Lamb, A. E. H. Love, J. H. Jeans. Elementary textbooks: J. Cox, *Mechanics*; R. C. Fawcett, *Statics and Dynamics*; C. S. Jackson and W. M. Roberts, *A First Dynamics*.

Kinetic Theory of Gases. This is a branch of the kinetic theory of matter which aims at

explaining its properties by the motions of the molecules which compose it. A gas is taken to consist of a vast number of molecules flying about in all directions with various and varying velocities, the path of any one molecule being made up of straight parts connected by curved parts where the molecule is deflected by encountering another molecule, or rebounding from the wall of an enclosure. At ordinary pressures the time during which it is moving in a straight line greatly exceeds the time occupied by encounters. The impacts on the walls of the enclosure give rise to the pressure. The temperature depends on the kinetic energy of the molecules ('heat, a mode of motion'). The tendency of gases to diffuse into one another, if in contact, or separated by a porous partition, is obviously explained by this theory, as well as gaseous viscosity (see *Hydrodynamics*), and the fact that the viscosity of a gas increases with rise of temperature.

The molecules may be supposed to attract one another when sufficiently close together. In the liquid state the molecules are so close together that in general the molecule is not moving fast enough to escape from the attraction of its neighbours, but evaporation from the free surface of a liquid is accounted for by the escape of those molecules whose velocity is exceptionally high, so as to form vapour, which is matter in the gaseous state.

Let V^2 be the arithmetic mean of the squares of the velocities of the molecules, p the pressure per unit area, and ρ the density. Then it can be shown that $p = \frac{1}{3}\rho V^2$; and, assuming that T , the absolute temperature, is proportional to V^2 , then $T \propto kV^2$, where k is a constant for a given gas. Hence $p = \rho T/3k$. This formula expresses the experimental laws of Boyle and Charles. The law of Avogadro, which states that for a given volume, temperature, and pressure the number of molecules is the same for every gas, is also deducible from kinetic theory.

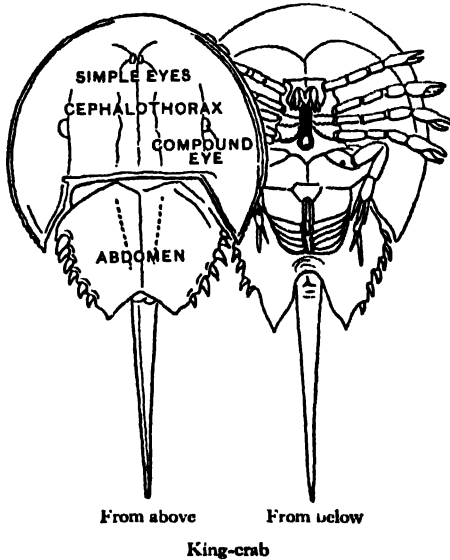
Amongst the other gaseous phenomena that can be explained by the kinetic theory are the difference between the two specific heats of a gas, the phenomena of liquefaction, dissociation and critical temperature, the conduction of heat, and the limits of the earth's atmosphere. Since, for any gas in a given state, p and ρ can be accurately determined, the formula $p = \frac{1}{3}\rho V^2$ yields the value of V with the same degree of accuracy. Again, if N be the number of molecules in unit volume, $Nm = \rho$. Hence if N is known, m can be found, and vice versa. There are various methods of determining these and other quantities entering into the theory of gases. The following are approximate data for hydrogen at 0°C . and 760 mm. pressure. $V = 1694$ metres per second. $N = 2.7 \times 10^{19}$ per cubic

centimetre. $m = 1.66 \times 10^{-24}$ gm. Number of collisions of molecules per cubic centimetre per second $= 1.6 \times 10^{28}$. Mean length of 'free path', 1.4×10^{-8} cm. Diameter of molecule, about $\frac{1}{1000}$ of mean free path.

The kinetic theory of matter was foreshadowed by Democritus and other Greek philosophers, Gassendi and Hooke in the seventeenth century, and D. Bernoulli in the eighteenth century, made advances, but the kinetic theory of gases as we now know it is due chiefly to R. Clausius, J. Clerk Maxwell, and L. Boltzmann.—BIBLIOGRAPHY: J. H. Jeans, *Dynamical Theory of Gases*; J. Clerk Maxwell, *Theory of Heat*.

King (O.H.Ger. *chunig*, *kuning*; A.Sax. *cyn-ing*, *cynig*; Eng., *king*, from Goth. *chuni*, tribe), the title of a ruler who is vested with supreme authority over a tribe, a race, a nation, or a state. Generally speaking, it was force which established thrones and created kings. A lucky soldier usurped a crown and founded a dynasty. "Le premier qui fut roi, fut un soldat heureux", says Voltaire, but this lucky soldier had a natural right to rule in virtue of his superior intelligence and the services he had rendered to the community. The first kings were individuals who had distinguished themselves from their fellow-men by virtue of their physical or mental superiority, strength, intelligence, or wealth. As their power increased, their office became hereditary in their families, although it sometimes remained elective. Kings were considered God's representatives upon earth, enjoyed divine adoration, and their persons were sacred. The royal dignity was surrounded by the halo of the divine; its power became superhuman, land became royal domain, subjects royal servants. After Charlemagne, and especially under the feudal system, the title of king implied considerable power and sovereignty. It then followed that 'the king can do no wrong'. It was at that time that kingship became territorial instead of tribal or national, i.e. the king was the king of the land and not of the people. Few new kings were created during the Middle Ages down to the French Revolution; but the reverse was the case during the nineteenth century, when several new kingdoms and kings arose, the latter calling themselves the kings of the people and not of the land, such as the King of the Belgians, the King of the Hellenes, &c. In modern times, since the rise of constitutionalism, with the menace of republicanism lurking in the background, kings are neither the chief source of authority nor are they absolute, whilst their sovereign power is mostly vested in the legislative body. The latter has also a right to depose an unworthy king. At present there are no absolute kings, and since 1918 only twelve European countries have a king at all.

King-crab (*Limulus*), a peculiar genus of animals placed in the ord. Xiphosura (sword-



tailed), of the class Arachnida. They are found on the Atlantic coasts of northern and tropical America, the shores of India and Further India, the Eastern Archipelago, China, and Japan. The head resembles a broad horse-shoe shaped shield, with two pairs of eyes upon the upper surface, the second pair being the larger and forming the true visual organs. The mouth opens on the lower surface, and around it are attached six pairs of limbs with spinous joints. A second shield somewhat hexagonal in shape covers the abdominal part, and beneath it are the gills, or *branchiae*, borne upon five pairs of appendages which represent the abdominal feet of the crab. The average length is about 2 feet. These crabs are destitute of swimming powers, and if placed on their backs they appear, like turtles, unable to recover their natural position. The commonest species is the *Limulus polyphemus*, found chiefly on the North American coast from Maine to Yucatan. The upper surface of the tail, as in other species, bears numerous spines. *Tachyplesus gigas* is common in the Malay region; *T. tridentatus* ranges from Borneo to Japan; *T. hawaii* is native to the Moluccas. *Carcinoscorpius rotundicauda* is found on the shores of India, Further India, Siam, the Moluccas, and the Philippines.

Kingfisher, the name of birds belonging to the family Alcedinidae, native to most parts of the world, and allied to hornbills and hoopoes. They are distinguished by the elongated, stoutly formed bill, broad at the base, and terminating

in a finely acute point; short rounded wings; short tail; strong feet, with third and fourth toes joined together. The common kingfisher, found in Great Britain (*Alcedo ispida*), has the upper part of the head, the sides of the neck, and the coverts of the wings green, spotted with blue. The back is dark-green in colour, the lower back and rump being of a bright-blue. The throat is white, and the under surface of the body a pale-brown colour. It frequents the banks of rivers, and, perched on the bough of a tree, watches for fish. When the prey is perceived, it dives into the water, secures the fish with its beak, and carries it to land, where it kills the prey and swallows it entire. It is about 7 inches in length. This bird has been greatly celebrated in ancient poetic and legendary lore, and is the subject of many superstitions. The American belted Kingfisher (*Ceryle alcyon*) is of a bluish-slate colour, with an iron-coloured band on the breast, whilst the head bears a crest of feathers. In the racquet-tailed kingfishers (*Tamiasptera*) of the East Indies, New Guinea, and the Moluccas two of the tail-feathers are narrow and elongated,



Kingfisher (*Alcedo ispida*)

with expanded tips. A large Australian species (*Dacelo gigas*) is known as the laughing-jackass (q.v.).

Kinghorn, a royal burgh of Scotland, in Fifeshire, on the Firth of Forth, a favourite summer-resort and golfing-place, and once the residence of the kings of Scotland. It was made a royal burgh in the twelfth century, and had its latest charter from James VI in 1611. Pop. (1921), 2425.

Kinglake, Alexander William, English historian, born 1800, died in 1891. He was educated at Eton and Cambridge, called to the Bar in 1837, but abandoned law in 1856. He first made his mark in 1844 by the publication of *Eothen*,

a narrative of Eastern travel. The first volume of his *Invasion of the Crimea* appeared in 1863, and at once established his reputation as a brilliant historian; seven volumes followed at intervals, the eighth and last in 1887. The book is a monumental work, but goes too much into details of events which have now ceased to be important.

Kings, Books of, form two books in the English and one book in the Hebrew canon of the Old Testament. The books of *Kings* are closely connected with the first and second of *Samuel*, and, following these, form the third and fourth in what is known as 'the four books of the kingdom'. From internal evidence it would seem that these were written by a series of contemporary authorities, with additions and glosses made by a later writer. The history in the books of *Kings* begins with the close of David's reign, and carries the events onwards to the capture of Jerusalem and the destruction of the temple. This embraces, according to the received chronology, a period of upwards of 400 years (1015-588 B.C.), and includes the history of both the kingdoms of Judah and Israel. The chronology, however, has been much disputed. In comparing these books with the *Chronicles* it is found that while the former describe the divided kingdom of Israel and Judah, the latter are occupied almost exclusively with Judah; and further, that the books of *Kings* seem to have been compiled under prophetic, and the *Chronicles* under priestly influence.

King's Bench, Queen's Bench, Court of, an ancient court of common law, which succeeded the *curia regis*. Formerly it was a separate court in England, and was divided into several branches for the trial of different kinds of pleas. With the Common Pleas and Exchequer it now forms the King's Bench Division of the High Court of Justice, and is presided over by the Lord Chief Justice of England. See *Supreme Court of Judicature*.

King's College, one of the colleges of Cambridge University, founded by King Henry VI in 1441. Eton College is a sister foundation, and there are very close ties between the two colleges. Until 1851 undergraduates of this college had the privilege of graduating without sitting for a university examination.

King's College, London, an educational institution incorporated in 1829, reincorporated in 1882, and now an integral part of the University of London (q.v.).

King's Counsel, Queen's Counsel, in England or Ireland barristers, and in Scotland members of the faculty of advocates, appointed counsel to the Crown, and specially sworn as such, their oath binding them to faithful service.

They do not act against the Government or Crown except by special permission, which is always granted. They have precedence over other barristers, and rank among themselves according to seniority. They are appointed by patent from the Crown on the nomination of the Lord Chancellor. They can act as judges of assize when named in the commission. It is the established etiquette that no king's counsel conducts any case without the assistance of a junior counsel. The professional robes of king's counsel are of silk instead of stuff like those of ordinary barristers; hence the phrase 'to take silk'. The first to be appointed to the rank of queen's counsel was Sir Francis Bacon in 1604. There were 308 K.C.'s in 1921.

King's County, an inland county of Leinster, Ireland; area, 493,263 acres. A large portion is covered by the Bog of Allen, and part of the south with the Slieve Bloom Mountains. Limestone occurs in the north-west, and has been quarried. The principal produce is oats, wheat, and potatoes, and there are breweries at Tullamore. In 1918 King's County returned one member to the British Parliament. The county town is Tullamore; Birr is next in size. Pop. 56,832.

Kingsley, Charles, English clergyman, novelist, and poet, born in 1819, died in 1875. He went to school at Clifton and Helston, and when his father became rector of St. Luke's, Chelsea, studied at King's College, London, and afterwards at Magdalen College, Cambridge, where he took his degree in 1842. He now became curate of Eversley, in Hampshire, and published a poem, *The Saint's Tragedy*, and a volume of *Village Sermons*, which became popular. This was followed in 1849 by the novel *Alton Locke*, in which his opinions of the social and economic questions of the time are powerfully expressed. Upon the same lines, but dealing with the subject from the agricultural side, followed his novel of *Yeast* in 1851. In 1853 was published *Hypatia*, and in 1855 *Westward Ho!*, both brilliant historical novels, the former dealing with the early Christian Church, the latter with the South American adventurers of the Elizabethan era. Among his other well-known works are: *Two Years Ago*; *Hereward the Wake*; *Glaucus, or the Wonders of the Shore*; *Andromeda and other Poems*; *The Water Babies*; and *At Last: a Christmas in the West Indies, the outcome of a visit*. He was professor of modern history at Cambridge from 1860 to 1869, became canon of Chester in 1869, and of Westminster in 1873, still retaining the living of Eversley. *Charles Kingsley, his Letters and Memories of his Life*, edited by his wife, was published in 1877. Kingsley was a great admirer of Darwin and Huxley, maintaining that science, and particularly the Darwinian theory, and

theology were quite compatible.—Cf. M. Kaufmann, *Charles Kingsley: Christian Socialist and Social Reformer*.

Kingsley, Henry, English novelist, brother of Charles Kingsley, was born in 1830, and died in 1876. Educated at King's College, London, and Worcester College, Oxford, he left England in 1853 and went to Australia, returning in 1858. In 1859 he published his novel *Geoffrey Hamlyn*, in which he utilized his Australian experiences. Of his other novels, *Ravenshoe*, *The Hillyars* and *the Burtons*, and *Austin Elliott* are the best. He was for a short time editor of the *Edinburgh Daily Review*, and went out as war correspondent in the Franco-German War, being the first Englishman to get into Sedan after its fall.

King's Speech, a document prepared by the Prime Minister and Cabinet, and read by the king from the throne in the House of Lords at the State opening of Parliament. The king drives to Westminster, and the members of the House of Commons are summoned by 'Black Rod' to attend the House of Lords to hear the speech. It is usually divided into three parts, opening with a reference to foreign relationships, and followed by a section which is addressed only to the members of the House of Commons and deals with finance, and concluding with a review of home affairs and an invocation for "the blessing and guidance of Almighty God". At four o'clock in the afternoon the speech is again read to both Houses, and 'an humble address is presented to His Majesty, thanking him for his most gracious speech'.

Kingston, William Henry Giles, novelist, was born in London in 1814, and died in 1880. He lived for many years in Oporto, where his father was in business, but settled in England in 1844, and in 1850 began the long series of boys' books for which he is chiefly famous. Among his best-known stories are: *Peter the Whaler*, *The Three Midshipmen*, *The Three Lieutenants*, *The Three Commanders*, and *The Three Admirals*. He also edited several boys' periodicals, and wrote a number of books of travel.

Kingston, a city of Ontario, Canada, on Navy Bay, at the outlet of Lake Ontario, and connected by the Rideau Canal with Ottawa. The Queen's University was founded in 1841, and Kingston is also the seat of the Royal Military College. The town is an important railway junction, and a service of lake steamers, as well as the canal, affords a ready means of communication by water. There are several grain elevators and flour-mills, shipbuilding-yards, and textile manufactories. The present city, founded 1782, on the site of the old French fort of Frontenac, was the capital of Canada from 1841 to 1844. Fort Frontenac was established in 1683 by Count de Frontenac, Governor of Canada,

and was destroyed by the Iroquois, but restored again in 1695. Pop. 18,874.

Kingston, the capital of Jamaica, on the south coast, connected by rail with the other towns of the island. It suffered immense damage in Jan., 1907, from an earthquake and consequent fire. The harbour, which is 6 miles long by 2 miles wide, is separated from the sea by a narrow slip of low land, and forms an excellent anchorage for vessels of any size. Pop. 57,879.

Kingston, a city of New York, United States, on the Hudson. It is united as a city with the former town of Rondout, on the Hudson and Delaware Canal, which taps the Pennsylvania coal-fields. The Senate House was founded in 1676. Pop. (1921), 26,688.

Kingston-upon-Thames, a town of England, county of Surrey, on the right bank of the Thames, 12 miles from Hyde Park Corner. Its antiquity is proved by numerous Roman remains found in its vicinity, and the Saxon kings were crowned here from Edward the Elder to Ethelred II. The stone on which the kings were crowned is preserved within an iron enclosure near the market-place. It returns one member to Parliament. Pop. (1921), 39,484.

Kingstown, a seaport of Ireland, on the south shore of Dublin Bay. The harbour construction was begun in 1815, and completed in 1859. There are two piers, enclosing an area of 250 acres, with a depth varying from 15 to 27 feet. Kingstown has regular mail-steamer communication with Holyhead. It is much frequented for sea-bathing, and is linked by tramway with Dublin. In 1821 George IV gave permission to change the name of the town from Duncleary to Kingstown, and this is commemorated by a granite, crown-surmounted obelisk. Pop. 16,941.

Kingstown, capital of St. Vincent, Windward Islands, West Indies, on the south coast of that island. Pop. 4800.

King-vulture, the *Gyparchus papa* of tropical America, exclusive of the West Indies. It is about 2½ feet in length, and upwards of 5 feet across the expanded wings, plumage generally white, the bare skin of the head and neck brilliantly coloured. The other vultures are said to stand quietly by until this, their monarch, has finished his repast.

King William's Town, or 'King', a town in the south-east of Cape Province, on the Buffalo River, connected by railway with the seaport East London and with the Cape railways generally. When Kaffraria was a separate colony, this town was its capital. Pop. (1918), 5685.

King-wood, a Brazilian wood believed to be derived from a leguminous tree, a species of *Triptolema*, but by some referred to *Brya ebenus*. It is beautifully streaked with violet

tints, and is used in turning and small cabinet-work. Called also *Violet-wood*.

Kink'ajou (*Cerculeptes caudivolutulus*), a plantigrade carnivorous mammal of northern South America, belonging to the raccoon family



Kinkajou (*Cerculeptes caudivolutulus*)

(Procyonidae). In habit it is omnivorous, nocturnal, and docile when captured. In shape it resembles the lemur: the legs are short, fur close and woolly, tail long and prehensile. Being fond of honey, it makes frequent forays upon the nests of bees.

Kino, an astringent extract, resembling catechu, obtained from various trees. The original is procured from *Pterocarpus Marsupium*, a handsome East Indian tree, nat. ord. Leguminosæ, which yields a valuable timber. Kino is the juice of the tree dried without artificial heat. African or Gambia kino is obtained from another species (*P. erinaceus*), a native of tropical Western Africa. Dhak-tree or Bengal kino is the product of *Butea frondosa*; while Botany Bay kino is got from various species of *Eucalyptus*. Kino consists of tannin, gum, and extractive, and is a powerful astringent.

Kinross', a small inland county of Scotland, west of Fife, and entirely surrounded by that county and Perthshire; area, 52,410 acres. It forms a level plain, enclosed by the Ochil Hills in the n.w., the Lomond Hills in the e., Benarty Hill in the s., and the Cleish Hills in the s.w. Loch Leven is in the centre of this plain. The geological formations are freestone, basalt, limestone, and coal in the south. Kinross-shire unites with one of the divisions of Perthshire in returning one member to Parliament. Pop. 7963.—There is a small town of the same name in the county. Pop. 2631.

Kinsale' (Ir. *Ceann-Saile*, Head of the Brine), a seaport town and watering-place of Cork, Ireland, of great historical interest. Milo de Courcy was created Baron of Kinsale in 1223, and his ancestors had the traditional privilege of remaining covered in the presence of royalty, exercised until the time of George IV. Kin(g)sale is the premier baronage of Ireland. The promontory, Old Head of Kinsale, a prominent landmark for navigators, forms one extremity of Courtmacsherry Bay, where the *Lusitania* was sunk on 7th May, 1915. Pop. 4020.

Kintyre, or Cantyre, a peninsula, Scotland, between the Firth of Clyde and the Atlantic, forming the southern division of Argyllshire. It is 40 miles long from the Isthmus of Tarbert to the Mull of Kintyre in the south-west, and has an average breadth of about 7 miles.

Kio'to, or Kyoto (formerly Miako), a city of Honshu, Japan, connected by railway with Osaka. It was formerly the residence of the Emperor, and the ecclesiastical capital of Japan. It is the centre of learning and of artistic manufactures, and has a university, established in 1897. Pop. (1920), 591,305.

Kipling, Rudyard, British author, was born on the 30th Dec., 1865. His father was for many years curator of the Lahore Museum in India. He was educated at the United Services College, Westward Ho, North Devon, a school which he has immortalized in *Sikh and Co*. At the age of seventeen he returned to India, and became assistant editor of *The Civil and Military Gazette and Pioneer*, a Lahore paper. In 1886 he published *Departmental Ditties*, a volume of light verse; and in 1887 *Plain Tales from the Hills*, a collection of short stories, appended. These were followed by *Soldiers Three*, *In Black and White*, *The Phantom Rickshaw*, *Wee Willie Winkie*, and other collections of short stories. These stories are told in a masterly and highly original way, and Kipling was at once acknowledged as among the foremost writers of fiction. The soldier-stories, and the stories of children and of official life, are especially good. After travelling in China, Japan, and America, he published a collection of sketches of travel under the title of *From Sea to Sea* (not published in book form until 1899). In 1891 he wrote his first long story, *The Light that Failed*, which has never attained the popularity of his short stories. *Barrack Room Ballads*, originally contributed to the *National Observer*, appeared in book form in 1892, and greatly increased Kipling's reputation as a writer of vigorous verse. A fine collection of stories, *Many Inventions*, appeared in 1893; and in 1894 and 1895 appeared *The Jungle Book* and *The Second Jungle Book*, which are considered by some critics to be Kipling's masterpieces. In 1897 he published *Captains Courageous*, a tale

of the Newfoundland fisheries, and in 1899 his realistic if somewhat highly coloured collection of school-stories, *Stalky and Co.* His other books include *Kim* (1901), *Just So Stories for Little Children* (1902), *Puck of Pook's Hill* (1906), *Rewards and Fairies* (1910), *A Diversity of Creatures* (1917), *The Years Between* (1918), and *Letters of Travel* (1920).

Kipling's work has always been recognized as the work of a master. He is one of the few living writers who excel in the difficult art of short story writing. His verse is vigorous and memorable; his prose is energetic and telling. Tangible recognition of his work has not been wanting. He was awarded the Nobel Prize for Literature in 1907, and is a Doctor of Letters of the Universities of Oxford, Cambridge, Edinburgh, Durham, and Paris (Nov. 1921). Some of his admirers have perhaps carried their admiration to the other side of idolatry, but Kipling must be accounted one of the most original and greatest forces in contemporary literature.—BIBLIOGRAPHY: F. L. Knowles, *A Kipling Primer*; G. F. Monkshood, *Rudyard Kipling: the Man and his Work*, and *The Less Familiar Kipling and Kiplingana*; J. Palmer, *Rudyard Kipling*; W. Leeb-Lundberg, *Word-formation in Kipling: a Stylistic-Philological Study*.

Kirchhoff (kir'hof), Gustav Robert, German physicist, born 1824, died 1887. He was professor of physics at Heidelberg, and afterwards at Berlin. His most important work in dynamics and rather in physics, notably in the theories of electrical induction, and of the elasticity of thin rods. His *Vorlesungen über mathematische Physik* is still read. The method of spectrum analysis is chiefly due to Kirchhoff and Bunsen.

Kirghiz (kir'gēz), a nomadic Mongol-Tartar race, numbering in its various branches about 4,500,000, and inhabiting the steppes that extend from the Lower Volga and the Caspian Sea in the west to the Altai and Tian-Shan Mountains in the east, and from the Sea of Aral and the Syr Daria in the south to the Tobol and Irtysh on the north. They are divided into two main branches: the highlanders or Kara-Kirghiz, and the steppe-dwellers or Kirghiz-Kazak. Their food is chiefly mutton and horseflesh, and their drink the nourishing fermented mare's milk called *koumiss*. They dwell in a *yurt* or semi-circular tent, the wooden framework of which is covered with cloth or felt. Their possessions are in sheep, camels, and a small hardy breed of horse, and they profess Mahommedanism, but tend more towards Shamanism.—BIBLIOGRAPHY: E. H. Parker, *A Thousand Years of the Tartars*; P. S. Pallas, *Observations sur les Kirghiz*.

Kirin, a province and city of Manchuria (China). The province has an area of 105,000

sq. miles, and a population of 6,000,000, and lies in the valley of the Sungari, the granary of Manchuria. It produces soya beans, millet, and other cereals, and cattle, horses, sheep, and pigs are extensively bred. Kirin is called Chuen Chang (Naval Yard) by the Chinese. Between Kirin and the Pechili Gulf there is much coal. The town stands on the Sungari, and is a great centre of the lumbering industry. It is on the railroad, and has, as a consequence, a telegraph and telephone system. There are fifty *yufang* (oil-factories) in the town, and many other manufactures. Pop. about 100,000.

Kirkcaldy (kir-ká'di), known as the 'Lang Toun', a royal and police burgh and seaport, Scotland, county of Fife, on the north shore of the Firth of Forth. It consists principally of one long, narrow, and twisting street, which, including suburbs, extends for about 4 miles west to east, and is traversed throughout its length by a single-track tramway. It has numerous flax-spinning mills, linen- and damask-factories, sailcloth- and net-works, roperies, and machine-factories, and the largest linoleum and floor-cloth works in the world. There is an excellent harbour, and a large shipping trade is carried on. Kirkcaldy is the birth-place of Adam Smith (*Wealth of Nations*), and a hall bears his name (Adam Smith Memorial Hall). Here also was linoleum invented by Michael Nairn (1847), who built a factory in Kirkcaldy, and the town remains famous to the present day for its floor-cloths. Kirkcaldy sends one member to Parliament. Pop. (1921), 39,591.

Kirkcudbright (kir-kó'bri), a maritime county of South-Western Scotland, on the Solway Firth. Area, 575,832 acres, of which about one-fourth is arable. The coast-line, generally precipitous, is considerably indented. There are extensive hilly districts; the rivers include the Dee and the Urr; and there are numerous lakes, the largest of which is Loch Ken. Granite is quarried in several districts, while lead, copper, and iron have been found. Kirkcudbright forms with Wigtownshire the district known as Galloway, and is called the *Stewartry*. The principal towns are Kirkcudbright (the county town), Dalbeattie, and Castle-Douglas. Pop. 37,156.—The county town is a royal burgh and port on the Dee, whose charter dates from James II, 1455. It has the ruins of Bombie Castle, built in 1582 by Sir Thomas Maclellan. These ivy-covered relics stand on the main street. Dundrennan Abbey (1140) lies 4 miles from the town, but only the transept and nave are now extant. Pop. 2101.

Kirkintilloch, a police burgh, Scotland, county of Dumbarton, 7 miles north by east of Glasgow, with which it is connected by rail (North British Railway) and the Forth and Clyde Canal. It is also reached by road services

of omnibuses from Bishopbriggs, Glasgow. In the Peel Park are remains of the Roman Wall of Antoninus and of Comyns Castle. It has iron-foundries, chemical-works, and coal-mines. Pop. (1921), 11,690.

Kirk-Kilisse, a town of Greece, 80 miles E. of Adrianople. The battle of Kirk-Kilisse was fought 23rd-24th Oct., 1912, when General Dimitriev and the Bulgarian Third Army engaged three Turkish army corps under Mahmud Mukhtar. On the morning of the 24th the Turkish army was utterly routed and fell back upon the Karagach line, the Bulgars occupying Kirk-Kilisse. In May, 1918, the town was ceded by Turkey to the Balkan Allies (Treaty of London), but restored to the Turks, Sept., 1918 (Treaty of Constantinople). On 10th Aug., 1920 (Treaty of Sèvres), it was finally allotted to Greece. Pop. 17,000.

Kirk-session, the lowest or initiatory court of the Established Church of Scotland. It consists of an ordained minister, generally the incumbent, who presides under the name of moderator, and the elders of the congregation, of whom two must be present to form a quorum. It takes cognizance of spiritual matters and of general ecclesiastical discipline within the congregation. Other Presbyterian Churches have a court of the same nature.

Kirk'wall, a royal and municipal burgh and seaport of Scotland, capital of the Orkney Islands, standing upon Kirkwall Bay, to the east side of the Island of Pomona or Mainland. The town is of great historical interest, and contains the Cathedral of St. Magnus, erected by Earl Ronald in 1187 to perpetuate the memory of his murdered uncle, Jarl Magnus, who was afterwards canonized, and is now patron saint of the Orkneys. The choir of the cathedral forms the parish church. The ruins of the Bishop's Palace in which King Haco died (1268), stand beside the cathedral. There are also the ruins of the Earl's Palace (1607), which belonged to the quondam Earl of Orkney, and the remains of a fortress of exceptional strength were cleared away to make room for an extension of the safe and ample harbour berthage. Pop. 3697.

Kirriemuir, a police burgh of Scotland, in Forfarshire. It has manufactures of coarse linens. Sir J. M. Barrie was born there, and has made the village famous as 'Thrums'. Pop. (1921), 3408.

Kis'faludy, Alexander, Hungarian poet, born in 1772, died in 1844. Having entered the Austrian army as a cadet, he served in Germany and Italy. In 1801 he left the army, and employed himself almost exclusively in agriculture and in literary pursuits. His principal lyrical work, *Himfy Szerelmek* (Himfy's Love-songs), gave him a first place among his native poets. He

afterwards wrote the historical dramas *John Hunniades* and *Ladislaus the Cumanian*.

Kisfaludy, Charles, dramatist, brother of the preceding, born in 1788, died in 1830. Among his best comedies are *The Sultors* and *The Murderers*. Among his tragedies the best is *Irene*. He was the founder of the modern national Hungarian drama.

Kish'inev, or **Chisinau**, a town of Roumania, capital of Bessarabia, on the Byk, a tributary of the Dniester. In 1812 only a small town, it is now the seat of the civil and ecclesiastical authority, has many churches, schools, theatres, and large markets for cattle and corn. Kishinev was the scene of a massacre of the Jews in April, 1903. Pop. about 128,000.

Kishm, or **Kissim**, an island of Persia, at the entrance to the Persian Gulf. In 1884 it was severely damaged by an earthquake. The chief town is Tavilah or Kishm. Pop. of town, 5000; of island, 15,000.

Kisma'yu, an open port, Africa, conceded by the Sultan of Zanzibar to the East Africa Company in 1899, incorporated in Kenya Colony, and ceded to Italy with Jubaland in 1925. Between Kismayu and Port Durnford there is a stretch of territory, 60 miles in length, which contains thousands of ruined buildings, and has given rise to the theory that Kenya coastal district was once very densely populated. Pop. about 4000.

Kissingen (kis'ing-en), a watering-place of Bavaria, on the Saale. The springs are gold and saline, and contain a large quantity of carbonic acid gas. They are used for cardiac trouble, both internally and as baths. Pop. 5800.

Kistna, or **Krishna**, a river of India, which rises among the Western Ghâts, flows in an easterly direction, and falls into the Bay of Bengal 200 miles north of Madras; length, 800 miles.

Kit-Cat Club, a political club formed about 1708, and dissolved in 1720, the resort of Addison, Steele, and others, named from Christopher Cat the owner of a tavern near Temple Bar, who supplied it with pies. All the members of the Club were Whigs, and the publisher Jacob Tonson was the secretary. A *kit-cat* portrait is one rather less than half-length, from Sir Godfrey Kneller's portraits of the club members.

Kitchener, Herbert Horatio, British soldier, was born on 24th June, 1850, at Listowel, Ireland, died 5th June, 1916. His father was Colonel Kitchener, late of the 18th Dragoons and 9th Foot, and the family had migrated from Hampshire and Suffolk. The Kitchener boys were privately educated, and Herbert passed into Woolwich in 1868, leaving in Dec., 1870. He then, while waiting for his commission, spent a short time with the French army under Chanzy during the Franco-Prussian War,

and was gazetted to the Royal Engineers in April, 1871. In 1874, tiring of routine soldiering, he was permitted to accept employment under the Palestine Exploration Society. With a short interval of leave, necessitated by ill-health, he remained in Palestine till 1877, when he returned to England, via Constantinople, in order to see something of the Russo-Turkish War. His work in Palestine resulted in the publication of a complete map of the country, on which the maps used in the European War were based. From 1878 to 1882 he was employed under the Foreign Office in Cyprus and Asia Minor in survey and consular work, and in Jan., 1883, he was gazetted captain and appointed to the Egyptian army as Bimbashi and second in command of the cavalry. In this year he also made a rapid survey of the Sinai Peninsula.

During the whole of 1884 Captain Kitchener was busily employed in Egypt in connection with the Khartum Relief Expedition, and Sir George Arthur quotes a letter from Gordon, of Nov., 1884, in which he expresses the opinion that when a governor-general should be required for the Sudan, Kitchener was the man. Late in 1885 Kitchener, having resigned his appointment in the Egyptian army, was given a brevet lieutenant-colonelcy, and lent to the Foreign Office as representative of the Government on the joint Anglo-French-German Commission about to assemble for the delimitation of the territories of the Sultan of Zanzibar. In 1886 he was back in Egypt as Governor-General of the Eastern Sudan, with head-quarters at Suakin, and was wounded during one of the many punitive expeditions he undertook. In 1888, being now a brevet-colonel and aide-de-camp to the queen, he was appointed adjutant-general in Cairo. The following year he spent a few weeks' leave in India, and on his return to Egypt was charged with the duty of reorganizing the Egyptian police. On completion of this special duty, Colonel Kitchener again took up his appointment of adjutant-general, which he retained till in 1892 he was appointed *Sirdar* of the Egyptian Army in succession to Sir F. Grenfell. The next few years were years of hard work and reorganization, which culminated in the decisive victories of Athara and Omdurman in 1898. For his services in Egypt Kitchener was created Baron Kitchener of Khartum and Aspal.

As an example of his organizing ability, Sir G. Arthur writes in vol. 1 of his *Life*: "For this modest sum (£2,418,218), and with the loss of about 60 British and 160 Egyptian lives, the Dervish power had been shattered, the Sudan reoccupied, nearly a million square miles brought under Anglo-Egyptian rule, and about 700 miles of permanent railway constructed".

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During 1899 Lord Kitchener was Governor-General of the Sudan. After the outbreak of the Boer War he was appointed Chief of the Staff to Lord Roberts, whom he joined at Gibraltar on 27th Dec., 1899. After being Roberts's right-hand man, and acting more as his deputy than as a chief of the staff, Lord Kitchener was, on 20th Nov., 1900, appointed Commander-in-Chief on Lord Roberts's resignation. Peace was not signed till May, 1902, and in July Lord Kitchener reached England. In October he was appointed Commander-in-Chief in India, where he arrived (via Khartum) on 28th Nov.

The greater part of 1903 was spent in an exhaustive tour of the North-West Frontier, after which he submitted his scheme for the 'Reorganization and Redistribution of the Army in India', being "convinced that much of its existing condition cried aloud for reform". Briefly speaking, the scheme substituted two armies for the existing four commands, and made recommendations for (1) reducing garrison troops to the minimum; (2) providing a field army ready for immediate action; (3) perfecting mobilization arrangements. This scheme was sanctioned in the following year. A suggestion for the establishment of a staff college in India was also approved, and materialized in July, 1905. On 1st Jan., 1905, Lord Kitchener issued his memorandum on the existing system of the dual control of the army in India, by which the military member of council (a soldier) had in effect the power of vetoing the recommendations of the Commander-in-Chief. Finally the Secretary of State upheld Kitchener's view that the military member was an anachronism, and that the Commander-in-Chief should be the only responsible military adviser of the Viceroy. Shortly after this Lord Curzon resigned.

At the express desire of the Secretary of State, Kitchener agreed to remain in India for an extended period, and it was not till Sept., 1909, that he handed over his command to General Sir O'Moore Creagh, V.C., and left India to fulfil an engagement entered into with the Australian and New Zealand Governments that he should advise them on the details of their proposed defence schemes. Early in 1910 he submitted a memorandum to the Governments concerned and returned to England, arriving at Plymouth in April. Shortly after his arrival he was presented by King Edward with the baton of a Field-Marshal.

In November of the same year he visited the Sudan, and from there made a journey through East Africa to Mombasa, returning to England in time for the coronation of King George. In Sept., 1911, he was appointed British agent in Egypt, which post he held till June, 1914, when

he returned to England on leave, having in the meantime been created an earl. Fate, however, ordained that his much-needed period of rest should be cut short, and when, in obedience to an order that all heads of missions abroad should at once rejoin their posts, he was actually on board the steamer to return to Egypt, his last and greatest responsibility came to him. On 3rd Aug., 1914, he received a message from the Prime Minister that he was to remain in England; two days later he became Secretary of State for War.

On taking over his duties at the War Office, he is quoted by Sir G. Arthur as remarking: "There is no army", implying that the 600,000 men—all that were available for home defence and for the expeditionary force—could by no stretch of imagination be considered numerically sufficient for the work in hand. As to the duration of the war he had no illusions. His immediate object was to get men and more men, and with this purpose in view he issued his proclamation:

"Your King and Country need you! An addition of 100,000 men to His Majesty's Regular Army is immediately necessary in the present grave national emergency. Lord Kitchener is confident that this appeal will be at once responded to by all who have the safety of our Empire at heart."

He was aiming at seventy divisions in three years; within a fortnight he had his first hundred thousand, and 'Kitchener's Army' was in being. In twelve months he had two million.

The multifarious duties of a Secretary of State for War kept Lord Kitchener almost entirely at the War Office, but on occasions he was able to make hurried visits to certain theatres of war to consult, advise, and hearten. These visits were appreciated and desired equally by commanders of our own forces and by those of our Allies; and it was on the occasion of one such visit that the end came. For some time prior to June, 1916, events in Russia had been unsatisfactory—largely on account of the want of arms and munitions—and it was by the express wish of the Tsar that on 5th June, 1916, a few days after he had addressed a meeting representing the House of Commons, Lord Kitchener embarked at Scapa on board H.M.S. *Hampshire*, to go to Archangel to advise with the Russian commanders on the situation on the Eastern Front. The outcome of this fatal voyage is a matter of history.

In a foreword to Sir George Arthur's *Life of Lord Kitchener*, Earl Haig writes: "We gained a respite (on the Marne). The Empire may thank God that it was given not only the respite but the man capable of taking advantage of it; the man . . . to all appearance the

only one we had at this crisis in whom the nation had the trust and confidence which made the task possible. Who can doubt that but for this man and his work Germany would have been victorious?"—BIBLIOGRAPHY: Sir George Arthur, *Life of Lord Kitchener*; Dr. S. Daiches, *Lord Kitchener and his Work in Palestine*; D. A. Mackenzie, *Lord Kitchener: the Story of his Life and Work*; E. S. Grew, &c., *Lord Kitchener*.

Kitchener. New name of Berlin, Canada (q.v.).

Kitchener Scholarships. These scholarships were founded in 1916 by the Kitchener National Memorial Fund. The original intention of the founders was to enable young men intended for a commercial career to study and gain experience in the countries of the Allied nations. The scholarships are worth £150 a year, and were first awarded to the sons of service-men who had been killed or disabled, and to service-men under twenty-five years of age. Their scope was increased at a later date, and they now include ordinary scholarships at British universities for medical and divinity students. They were awarded to men who abandoned a university career in order to join the navy or army.

Kitchen-middens, the name given to certain mounds, from 3 to 10 feet in height and 100 to 1000 feet in length, found in Denmark and in different parts of Scotland. They contain relics of what is known as Maglemosian culture, which entered Europe from Western Siberia and clung to the Baltic area and Scotland. This culture dates back beyond the introduction of the Neolithic industry.

Kitchens, Communal, opened during the European War by the Ministry of Food in London and other large towns of the United Kingdom, had for their original purpose that of supplying to the working-classes, for consumption in their own homes, cooked food of wholesome quality and moderate price. Their name, unpopular as suggesting a step in the direction of communism, was changed to that of National Kitchens; while the difficulty of keeping the food hot in transit, together with other reasons, militated against the success of the original plan, and the kitchens ultimately became restaurants, meals being served on the premises under the direction of specially trained manageresses supplied from a central headquarters in London. Many of these National Restaurants proved highly successful, being much appreciated, not only by the 'working-classes', but by others of limited means. After the end of the European War the Ministry of Food announced the intention of closing the restaurants; but these were, in several cities, taken over and continued by the local authorities.

Kite, a bird of the falcon family, differing from the true falcons in having a somewhat long

forked tail, long wings, short legs, and weak bill and talons. This last peculiarity renders it the least formidable of the birds of prey. The common kite, glead, or glade (*Mihus icthnus*), now a rare British bird, ranges through Europe to North Africa, Syria, and Asia Minor. It preys chiefly on the smaller quadrupeds, birds, and young chickens. It usually builds in the fork of a tree in a thick wood. The pariah kite (*M. govinda*) is a well-known Indian scavenger, as is the Brahminy kite or Pondicherry eagle (*Haliastur indus*), which ranges to Australia and New Guinea.



Swallow-tailed Kite (*Elanoides furcatus*)

A related species, the whistling kite (*H. spheurnus*), inhabits the last two countries and also New Caledonia. The common kite of America is the *Ictinia mississippiensis*. The awl-billed or everglade kite (*Rostrhamus sociabilis*), which ranges into South America from Florida and Cuba, possesses a slender hooked beak adapted to extracting snails from their shells.

Kitovo Hills, a range of hills in Tanganyika Territory. The strong positions constructed by the Germans in these hills, in the beginning of the European War, were captured by General Smuts in March, 1916.

Kit's Coty House, at Aylesford, Kent, a fine specimen of a dolmen, composed of three upright stones, about 8 feet high, and a cap stone of about 11 feet in length.

Kittiwake, a species of gull (*Rissa tridactyla*), found in great abundance in all the northern parts of the world wherever the coast is high and rocky.

Klung-chow, capital of Hainan Island, China,

a treaty port since 1876. Hoi-tau is the seaport. Pop. 58,527.

Kizil-Irmak (the Turkish for 'Red River'), a river known to the ancients as the Halys, the principal river of Asia Minor. Rising in the Karabel Dagh, east of the town of Sivas, it flows in a circuitous route for about 500 miles, and enters the Black Sea near Sinope.

Kizil-Kum, a sandy desert in Asia, south-east of Lake Aral, lying between the Amu Daria (Oxus) and the Syr Daria.

Klapka, Georg, Hungarian general, born in 1820, died in 1892. Educated in the artillery school, Vienna, he was appointed to a command in 1847. In the Hungarian Rebellion of 1848 Klapka joined the revolt as chief of the staff, and in 1849 he took command of an army corps. For a short time he was Minister for War, and then he took command at Komárom, which he defended brilliantly until he marched out on his own terms. He emigrated to Britain almost immediately, but eventually retired into Switzerland. In 1866 he organized a Hungarian division for the Prussian army, and was permitted to return to Hungary. He died at Budapest. He wrote *Memoirs of the War of Independence* (1850) and *The National War in Hungary and Transylvania*.

Klaproth (kláp'rôst), Heinrich Julius, German Orientalist and traveller, born in 1783, died 1855. Among his numerous writings may be mentioned his *Description of the Eastern Caucasus*, *Description of the Russian Provinces between the Caspian and the Black Seas*, *Catalogue of the Chinese and Manchu Books and MSS. in the Royal Library of Berlin*, *Asia Polyglotta*, and *Collections of Egyptian Antiquities*.

Klausenburg (klou'zên-burh; Hun. Kolozvár, now called Cluj), a town of Roumania, formerly belonging to Austria, capital of Transylvania. The cathedral (S. Michael) was founded by King Sigismund (1414), and the Reformed church was built by Matthias Corvinus in 1486. It had a Magyar University, founded in 1872, but a new Roumanian University was founded in 1919. Klausenburg was founded by the Romans, and was formerly walled. Pop. 60,000.

Klausthal, formerly a town of Prussia, on the Harz, the centre of an important mining district, now a suburb of Zellerfeld.

Kléber (klâ-bâr), Jean Baptiste, French general, born at Strasbourg 1758, and assassinated in Cairo by a fanatic in 1800. He was the son of a mason, and studied in Paris for two years to qualify himself as an architect. During his training, however, he assisted two Austrian nobles in a tavern brawl, and was nominated, as a reward, to the Military School at Munich, from which he obtained an appointment in the Austrian army. He resigned this in 1783, and eventually

joined the Revolutionary army in France (1792), where his military training soon gained him a commission as adjutant. He greatly distinguished himself in the defence of Mainz, and was made brigadier-general of the army of la Vendée, in which he subsequently became general of division. In 1794 he was sent to the army of Sambre and Meuse, and greatly distinguished himself at Fleurus. Under Jourdan he directed the passage of the Rhine at Düsseldorf and the subsequent retreat. Under Bonaparte he accompanied the army to Egypt as a general of division, and when Napoleon left, Kléber became commander-in-chief (1799). Finding his position hopeless, Kléber concluded the Convention of El Arish with the British, by which the French were to be conveyed home with arms and baggage, but Lord Keith refused to ratify the agreement, and Kléber immediately recommenced the subjugation of the country. He fell upon and slaughtered the Turks at Heliopolis, against odds of six to one, and retook Cairo, where he was assassinated. A splendid soldier and one of the finest of the Revolutionary generals, Kléber combined both executive and administrative talents to an exceptional degree, and, although he did not choose to rise above a divisional command, there is every proof that as a general and an administrator he was appreciably superior in capacity to his comrade Jourdan. His heart is buried at Strasbourg, under his monument.—BIBLIOGRAPHY: A. Dumas, *Mémoires* (vol. i); General Pajol, *Kléber: sa vie, sa correspondance*.

Klein-Zillebeke, a village of Belgium, in Western Flanders, 8 miles S.E. of Ypres. It was the scene of heavy fighting during the European War. Captured by the Germans in 1914, it was retaken by British troops in July, 1917.

Kleptomania (Gr. *kleptō*, I steal), a term applied to persons who succumb to an irresistible impulse to steal. It is often an expression of some interference with the normal powers of moral control, such as may occur in persons addicted to the excessive use of alcohol or such drugs as opium and cocaine, or in those suffering from mental disorder. In admitting the plea of kleptomania great caution is needed. The best way to arrive at a judgment is to consider the previous character and personal interests of the person charged; to determine the value and usefulness of the article appropriated; the methods of the appropriation and its probable motive. Thus when a baronet steals broken crockery, and a clergyman purloins innumerable cheap Bibles, the ordinary motives for theft are inapplicable, and when the article is taken ostentatiously, there is then a strong case in favour of kleptomania. When this is established, the person so affected must be treated as one mentally diseased.

Klinostat, an instrument used in plant physiology for experiments on geotropism (q.v.); by means thereof a living plant can be rotated, continuously or intermittently, around any axis at various slow rates of speed.

Klipspringer, a small South African antelope,



Klipspringer (*Oreotragus saltator*)

Oreotragus saltator, inhabiting the most inaccessible mountains of Cape Province.

Klondike, a district of a river of the Yukon, North-Western Canada, the river being a tributary of the Yukon, which it joins at Dawson City, in about 64° N. and 130° W. Placer gold was discovered here in quantity in 1896, the first find being made in Bonanza Creek, and a great 'rush' immediately took place, adventurers arriving from all quarters and fortunes being made in a night, although more by the storekeepers than by the actual diggers. There are now good communications by rail and road with Dawson City (pop. 8000), the centre of the gold-mining industry in the Yukon. See *Lynn Canal*.

Klopstock, Friedrich Gottlieb, a celebrated German poet, born in 1724, died in 1803, famous as author of the sacred epic *The Messiah*. The first three cantos of this work were published in 1748, and excited universal attention. Klopstock was invited to Copenhagen by Count Bernstorff, and offered a small pension. In 1764 he wrote his drama *Hermanns Schlacht* (Battle of Arminius), and sent it to the Emperor Joseph, but without appreciation being shown. In 1771 he left Copenhagen for Hamburg as *hofrat* and counsellor of the *margrave* of Baden. In Hamburg he finished his *Messiah*. His work did much to free German literature from French influence.—BIBLIOGRAPHY: K. Heinemann, *Klop-*

stocks Leben und Werke; F. Muncker, F. G. Klopstock.

Kluck, Alexander H. R. von, German general, born 1846, served in the Austro-Prussian (1866) and Franco-Prussian (1870-1) Wars, was infantry inspector-general in 1913, and commanded the German right flank (First Army) in 1914 (European War), when Belgium was occupied and the Allies retreated from Mons. He was defeated on the Marne and on the Aisne, and retired in Oct., 1916.—Cf. A. H. R. von Kluck, *March to Paris*.

Knapweed, a popular name given to some species of *Centaurea*. *C. Nigra*, black knapweed, and *C. scabiosa*, greater knapweed, are common weeds in Britain, being rough, hardy, herbaceous plants growing by waysides.

Knaresborough, a town of England, county of York (West Riding), on the Nidd. The environs of the town abound with objects of interest, including the ruins of the castle, founded in 1170, and dismantled in 1648; the dropping well, possessed of powerful petrifying properties; and several curious excavations. Pop. (1921), 5518.

Knee, or Knee-joint, that joint in the lower limbs of man which corresponds to the elbow in the upper, and is formed by the articulation of

ment of the former. In front of the knee-joint is the *patella* or *knee-pan*. The joint is capable of flexion and extension, and of a very slight rotatory movement. The accompanying figure and explanations will enable the joint and its chief features to be understood.

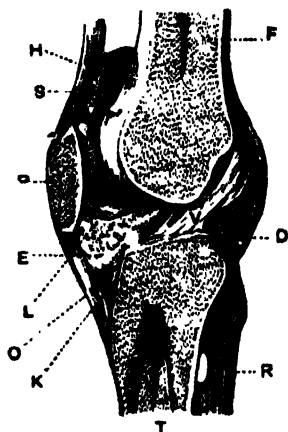
Kneller (nel'ér), Sir Godfrey, portrait-painter, born at Lübeck 8th Aug., 1648, died in London 1723. After studying under Bol and Rembrandt at Amsterdam, he visited Rome, Venice, and Hamburg, arrived in England (1674), and succeeded Sir Peter Lely as court painter to Charles II (1680). He was court painter to James II, William III, Anne, and George I, who made him a baronet. He painted all the celebrities of the English court, and the forty-eight members of the Kit-Cat Club, and he executed portraits of ten sovereigns, including Louis XIV and Peter the Great. He was highly praised by Dryden, Pope, Addison, and Steele, but his works are of more value historically than as works of art.

Kneller Hall, Twickenham, built by Sir Godfrey Kneller (1711), and now the Royal Military School of Music. It is a purely military establishment for the training of army bandmen and bandmasters.

Knight, Charles, English editor and publisher, born 1791, died 1878. He succeeded his father as a bookseller in Windsor, and for a number of years he edited a Windsor newspaper. Having removed to London in 1823, he commenced *Knight's Quarterly Magazine*, which contained the earliest contributions to literature of Macaulay, Præd, and Derwent Coleridge. In 1827 he became superintendent of the publications of the Society for the Diffusion of Useful Knowledge, established by Brougham in 1825, superintending and publishing *The Library of Entertaining Knowledge*; *The Penny Magazine*; and *The Penny Cyclopædia*, afterwards remodelled as *The English Cyclopædia*. An autobiography, *Passages of a Working Life During Half a Century*, appeared in 1863-5.—Cf. A. A. Clowen, *Charles Knight: a Sketch*.

Knight, formerly a term connected with chivalry (q.v.), but now an honour conferred by the king for the recipient's lifetime, and carrying with it the privilege of the prefix *Sir*. The wife of a knight is styled *Lady*. There are nine different British orders of knighthood; a knight who does not belong to any order is known as a knight-bachelor. The first civil knight of England was Sir William Walworth, Lord Mayor of London, who killed Wat Tyler in 1381. Knight-hoods are, in the main, conferred for valuable services to the Crown and to the community.

Knighthood, Orders of, the name given to organized and duly constituted bodies of knights. The orders of knighthood are of two classes—



Section through Knee-joint

F, Femur. T, Tibia. R, Fibula. M, Synovial pouch. S, Tendon of extensor muscle. P, Patella. E, Pad of fat. L, Synovial fringes. O, Ligamentum patellæ. K, Bursa. V, Anterior cruciate ligament. D, Posterior ligament.

the femur or thigh-bone with the tibia or large bone of the leg. The lower end of the femur terminates in two oblong rounded masses, called the *condyles* of the femur, which rest in two flat surfaces on the upper end of the tibia; interposed between the two bones are the *semi-lunar cartilages*, which diminish the pressure of the femur on the tibia, and prevent the displace-

either they are associations or fraternities possessing property and rights of their own as independent bodies, or they are merely honorary associations established by sovereigns within their respective dominions. To the former class, belonged the three celebrated religious orders founded during the Crusades—Templars, Hospitallers, and Teutonic Knights. The other class, consisting of orders merely titular, embraces most of the existing European orders. The British orders are the Garter, the Thistle, St. Patrick, the Bath, the Star of India, St. Michael and St. George, the Indian Empire, the Royal Victorian Order, and the British Empire. The Order of Merit and the Distinguished Service Order cannot be classed as orders of knighthood. The various orders have each their appropriate insignia, which generally include a badge or jewel, a collar, a ribbon of a certain colour, and a star.—BIBLIOGRAPHY: Sir N. H. Nicholas, *History of the Orders of Knighthood of the British Empire*; J. H. L. Archer, *Orders of Chivalry from the Original Statutes of the Various Orders of Knighthood*.

Knight Service, the original and most honourable kind of feudal land tenure. The holder of a knight's fee, the extent of which is now doubtful, was bound to render military service to his lord for forty days in every year if required. The holder of half a knight's fee attended twenty days, and the holder of smaller fractions in proportion. Knight service was abolished by 12 Charles II, cap. xxiv, freehold taking its place.

Knights Hospitallers, Knights of St. John of Jerusalem, afterwards *Knights of Cyprus*, *Knights of Rhodes*, and lastly *Knights of Malta*, a pre-eminently military order possessing religious privileges granted by the Pope, and existing primarily for the defence of the Holy Sepulchre against infidels, and for the protection of pilgrims proceeding to Jerusalem. They originated in a Benedictine monastery which, with two hospices, was founded at Jerusalem in 1048 by some merchants of Amalfi. This monastery was dedicated to St. John the Baptist, and the monks, who were called Brothers of St. John or Hospitallers, had the duties of caring for the poor and sick and of assisting pilgrims.

In 1118 the order was regularly instituted as a military order, and lands were presented to it in both Europe and the Holy Land until it was in actual possession of over twenty thousand manors or *commanderies*, each governed by a *preceptor* subordinate only to the autocrat, the *Grand Master*. Vows of chastity, obedience, and poverty were demanded of all novices, who had also to swear allegiance to the Church and faithfulness in her defence against infidels. Brethren were divided into three classes: *knights*, who

were organized for the defence of Jerusalem against the Saracens; *chaplains*, who upheld the religious traditions of the order; and *serving brethren*, who performed all menial tasks; but all classes took the vows and wore the prescribed uniform, which consisted of a long black mantle bearing an eight-pointed cross (Maltese) worked in gold and worn in war, but exchanged for a similar cloak in white in times of peace.

In 1201 Palestine was reconquered by the Saracens, and the head-quarters of the Hospitallers was removed to Limasol, in Cyprus, whence, in 1310, they migrated to Rhodes, and settled there until 1522, when they yielded to the Sultan Sulman II after a long and arduous siege. The survivors retired to Candia and eventually settled in Malta, ceded to them by the Holy Roman Emperor, Charles V, in 1530, and here they remained, a bulwark of Western Europe against Turkish navies, until comparatively modern times. The island was taken by Napoleon in 1798, and the Hospitallers ceased to exist as a vital institution.

In England the order had already been abolished (Henry VIII), while in the first year of the reign of Elizabeth all Hospitaller property had been confiscated. The Revolution virtually extirpated all such bodies in France.

A kindred body, *The Templars*, who were suppressed in 1312, and whose property reverted thereupon to the *Knights Hospitallers*, had a similar organization, ably described in Sir Walter Scott's *Ivanhoe*.

In the nineteenth century the Hospitallers were revived as a philanthropic body, and now carry on ambulance and red-cross work under the Convention of Geneva.—Cf. J. M. Kemble, *The Knights Hospitallers in England*.

Knights of Labour, a labour organization founded at Philadelphia in 1869. The association was primarily a political body; as an industrial weapon it suffered from the indiscriminate association of all classes of labour. Its membership grew rapidly after 1883, exceeding half a million in 1886, and then as rapidly dwindled, owing to the competition of the American Federation of Labour (founded 1881), which is now the body representing organized labour in the United States (and also to some extent in Canada).—Cf. W. Kirk, *Knights of Labour and the American Federation of Labour*.

Knights of Windsor, Poor, a charity founded by Edward III for the benefit of twenty-six poor military men. William IV in 1833 changed the name to the Military Knights of Windsor. The Naval Knights of Windsor are supported by a bequest of Samuel Travers.

Kniphofia, a genus of large South African herbs with grass-like leaves and long spikes of scarlet or yellow flowers. Several are grown as

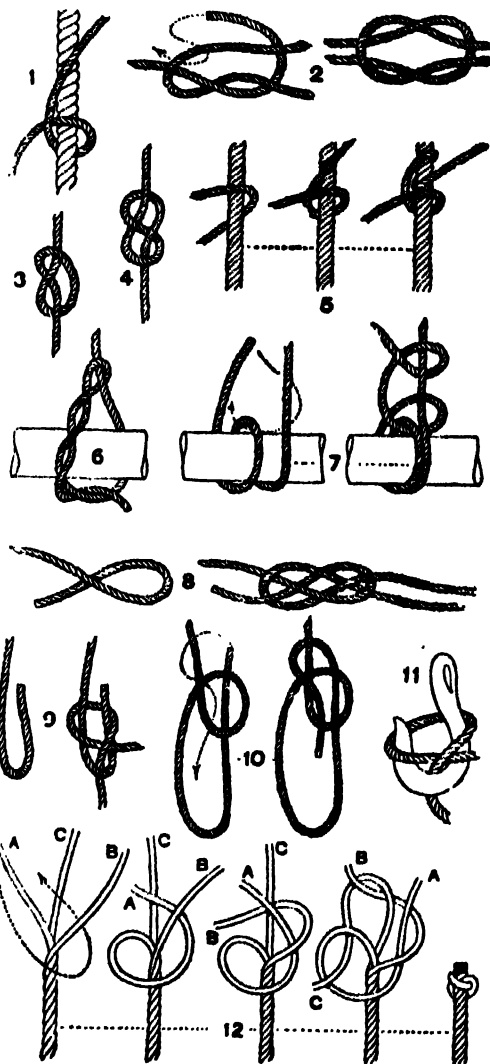
decorative plants under the name of red-hot poker or devil's poker.

Knitting refers to the operation of making a fabric from a series of loops worked usually from a single thread which is curved upon itself and made to intersect with the loops of the preceding course of stitches. The manner in which one row of loops hangs on another creates considerable elasticity of fabric, which makes it suitable for articles to be worn next the skin, as it can yield to every movement of the body and readily assumes its original position and shape. When fashion demands coarse-gauge fabrics from thick yarns, an impetus is given to hand-knitting, but for large-scale manufacturing purposes the operation is performed on knitting-frames and machines. Modern automatic types have reached a high degree of productive capacity, and on average-size yarns one of the most recently constructed knitting-machines can give a production of nearly 1000 yards of full width fabric in a day of nine hours, which is a rate which cannot be approached by any other type of fabric-producing mechanism. Many knitting-machines not only produce the actual knitted material, but also give the material its size and shape, so that the actual garments are shaped on the machine except for the necessary seaming or joining together of parts to produce the finished garment ready to wear. Recent developments in knitting have been largely in the direction of producing fabric in increasing fineness of gauge, and with the improvement of the texture to give greater rigidity and firmness, it has become adaptable for almost every kind of garment.

Knolles (nôlz), or **Knowlles**, Richard, an English historian, born about 1545, died 1610. He was educated at Oxford, and became master of the free school of Sandwich, in Kent. He wrote a *General History of the Turks* (published in 1603 and 1610), the style of which is highly commended by Johnson, Hallam, and other critics, and *Lives and Conquests of the Ottoman Kings and Emperors*, continued to and printed in 1621.

Knot, a complication of a thread, cord, or rope, or of two or more threads, cords, or ropes, by tying, knitting, or entangling. Knots expressly made as means of fastening differ as to form, size, and name according to their uses, as overhand-knot, reef-knot, half-hitch, clove-hitch, timber-hitch, fisherman's-bend, carrick-bend, sheet-bend, single-wall knot, double-wall knot, &c. The term knot is also applied on ship-board to a division of the log-line which is the same fraction of a mile as half a minute is of an hour, that is, it is the hundred and twentieth part of a nautical mile; hence, the number of knots run off the reel in half a minute shows the

vessel's speed per hour in miles. When a ship makes 8 nautical miles an hour, she is said to



Knots

1, Half-hitch. 2, Reef-knot. 3, Overhand-knot. 4, Figure-of-eight knot. 5, Clove-hitch. 6, Timber-hitch. 7, Fisherman's Bend. 8, Carrick-bend. 9, Sheet-bend. 10, Bowline. 11, Midshipman's Hitch. 12, Single Wall-knot.

make 8 knots, a nautical mile being equal to 6080 feet.

Knot (*Tringa canutus*), a bird of the plover family, which breeds in the Arctic regions, and is a common winter visitor to Britain.

Knotgrass, a very common British weed of the genus *Polygonum* (*P. aviculare*), remarkable

for its wide distribution. It is of low growth, with branched trailing stems and knotted joints.

Knout, a whip similar to the cat-o'-nine-tails, formerly used in Russia for the flogging of criminals and political offenders. It was withdrawn from general use by ukase of Nicholas I, and had been in existence from about A.D. 1500, in the reign of Ivan III. Although it existed in different forms, it consisted essentially of 10-inch strips of raw hide, plaited or otherwise, and secured to a 10-inch handle. Floggings were administered on a definite plan. On sentence the prisoner was stripped, secured to a pole or frame, and received the authorized number of lashes on his back. There was no respite and no clemency exercised in regard to the endurance of a prisoner. Floggings frequently proved fatal, about a hundred lashes constituting a death sentence. Peter the Great is said to have knouted his son to death.

Knowles (nôlz), James Sheridan, dramatist, born at Cork, 12th May, 1784, died at Torquay 30th Nov., 1802. He took to the stage in 1798, but meeting with indifferent success, he devoted himself to teaching, first in Belfast, and afterwards in Glasgow. His tragedy of *Caius Gracchus* was performed in 1815 with success, and from this time he had a prosperous career as author, actor, and lecturer. About 1845 he retired from the stage. His principal works are: *Caius Gracchus* (Belfast), 1815; *Virginius* (Glasgow), 1820; *William Tell* (Drury Lane), 1825; *The Hunchback* (Covent Garden), 1832; *The Wife of Mantua* (Covent Garden), 1833; *The Love-chase* (Haymarket), 1837; and *Love* (Covent Garden), 1839. In 1847 and 1849 he published two novels, *Fortescue* and *George Lovell*.

Knox, John, Scottish Reformer, born near Haddington in 1513 or 1514, though some say 1505, died at Edinburgh in 1572. He was educated at the burgh school of Haddington, and, according to Beza, at St. Andrews, where he is said to have had Dr. John Mair or Mayor as his philosophical and theological teacher, but did not take a degree. He took minor orders, and for some time acted as a public notary in East Lothian. He adopted the reformed faith about 1542-4, and entered the family of Douglas of Longniddrie as tutor to his sons and those of the laird of Ormiston. In 1546-7 he preached to the beleaguered Protestants in the castle of St. Andrews, and when it was taken by the French, Knox was sent to France with the other prisoners, and put to the galleys, from which he was released in 1549. He passed over to England, and, arriving in London, was licensed either by Cranmer or the Protector Somerset, and appointed preacher, first at Berwick, and afterwards at Newcastle. In 1551 he was appointed chaplain to Edward VI, and preached

before the king at Westminster, who recommended Cranmer to give him the living of All-hallows, in London, which Knox declined, not choosing to conform to the English liturgy. It is said that he also refused a bishopric. On the accession of Mary, in 1554, he quitted England, and sought refuge at Geneva, where he had not long resided before he was invited by the English congregation of refugees at Frankfort-on-the-Main to become their minister. A dispute concerning the use of a church service sent him back to Geneva, whence, after a residence of a few months, he ventured, in 1555, to pay a short visit to his native country. He again retired to Geneva, where he wrote several controversial and other works, including *The First Blast of the Trumpet against the Monstrous Regiment of Women*, chiefly aimed at the cruel government of Queen Mary of England, and at the attempt of the Queen Regent of Scotland to rule without a Parliament. A *Second Blast* was to have followed; but the accession to the throne of England of Queen Elizabeth, who was expected to be friendly to the Protestant cause, prevented it. In May, 1559, he returned to Scotland, and immediately joined the Lords of the Congregation. He preached at Perth on the occasion when the inflamed multitude made a general attack on the churches of the city, the altars being overturned, the pictures destroyed, the images broken, and the monasteries almost levelled to the ground. Similar vandalism took place in many other places, but these proceedings were censured by the reformed preachers and by the leaders of the party. Being appointed minister of Edinburgh, he took a prominent part in the proceedings of the Protestant leaders from this time onward, and had the principal share of the work in drawing up the *Confession of Faith*, which was accepted in 1560 by the Parliament. This *Confession of Faith* is known as the 'Scots Confession', and was superseded by that of Westminster. In 1561 the unfortunate Mary arrived in Scotland. She immediately began the regular celebration of Mass in the Royal Chapel, which, being much frequented, excited the zeal of Knox, who openly declared from the pulpit "that one Mass was more lightful to him than 10,000 armed enemies landed in any part of the realm". This freedom gave great offence, and the queen had long and angry conferences with him on that and other occasions. He preached with equal openness against the marriage of Mary and Darnley, giving so much offence that he was called before the Council and inhibited from preaching. In the year 1567 he preached a sermon at the coronation of James VI, when Mary had been dethroned, and Murray appointed regent. After the death of Murray, in 1569, Knox retired for a time to St. Andrews.

KNOXVILLE

In 1572 he was greatly offended with a convention of ministers at Leith for permitting the titles of archbishop and bishop to remain during the king's minority. At this time his constitution was quite broken, and he received an additional shock by the news of the massacre of St. Bartholomew. He had, however, strength enough to preach against it, but soon after took to his bed and died. He was buried in what was then the churchyard of St. Giles, and when the remains were laid in the grave, a contemporary uttered the following words: "Here lyeth a man who in his life never feared the face of man". Nearly three centuries later the historian Froude wrote of Knox "that no grander figure can be found, in the entire history of the Reformation in this island, than that of Knox". He was twice married, first to Marjory Bowes in 1555, and secondly, in 1564, to Margaret Stewart, daughter of Lord Ochiltree. In addition to numerous polemical tracts, letters, and sermons, Knox wrote a *Historie of the Reformation of Religion within the Realm of Scotland*. The best edition of his works is that edited by David Laing (1846-64).—BIBLIOGRAPHY: D. Buchanan, *Life and Death of John Knox*; T. McCrie, *Life of John Knox*; P. Hume Brown, *John Knox*; T. Innes, *John Knox*; A. Lang, *John Knox and the Reformation*; D. Macmillan, *John Knox: a Biography*; J. Stalker, *John Knox: his Ideas and Ideals*; A. R. MacEwen, *A History of the Church of Scotland*.

Knoxville, city of United States, capital of Knox county, Tennessee, an important commercial and manufacturing centre at the head of steamboat navigation on the Holston River, 165 miles east of Nashville, served by the Louisville and Nashville Railroad. It contains the East Tennessee University, the Knoxville University, the State agricultural college, and other educational and literary institutions. It was settled in 1787, and became a city in 1815. Pop. 77,818.

Knutsford, a town of England, county of Chester, 15 miles s.w. of Manchester. It is famous as the 'Cranford' of Mrs. Gaskell's novel, and gives name to a parliamentary division of Cheshire. Pop. (1921), 5411.

Koala (ko-á'la), the native name for an Australian marsupial belonging to the phalanger family (Phalangeridae). It somewhat resembles a small bear, hence its scientific name, *Phascolarctos cinereus* (Gr. *phaskōlos*, a pouch, and *arktos*, a bear). There is hardly any vestige of a tail. Its forefeet have five toes, two of which are opposed to the other three. The koala lives in gum trees (*Eucalyptus*), feeding on the leaves. It is known by the names of 'native sloth' and 'native bear'.

Kōbe, third city of Japan, on the Island of Honshu. It is the seaport of Osaka, the 'Man-

KOCH

chester' of Japan, with which it is connected by rail (20 miles). Kōbe is on the Inland Sea, and with it is merged as a suburb the former town of Hyogo. It houses the great Kawasaki shipyards, in which a plant has been specially laid down for warship construction, and is generally a thriving industrial centre. Kōbe has cotton- and silk-factories and steelworks. Pop. (1920), 608,628.

Kobrin, a Lithuanian town, formerly in the Russian government of Grodno, and once the capital of a principality of the same name. Pop. 10,500.

Koch (koh), Robert, German bacteriologist, was born at Klausthal, Hanover, in 1848, died in 1910. After studying medicine at Göttingen, he practised as a physician at Wallstein, and began the investigations that have made him one of the most famous of bacteriologists. In 1876 he succeeded in isolating the anthrax bacillus, perfecting his method of inoculation against the disease in 1888. In 1882 he discovered the bacillus of tuberculosis, and in the following year was sent by the German Government to Egypt and India for the purpose of finding the cholera germ, and this he succeeded in identifying with the so-called 'comma bacillus'. In 1890 he announced his discovery of tuberculin, a preparation antagonistic to the tuberculosis bacillus, but it did not subsequently prove successful as a remedy. In 1905 he was commissioned by the German Government to investigate the 'sleeping sickness' in West Africa.



Koala (*Phascolarctos cinereus*)

He also undertook researches into rinderpest in South Africa, into bubonic plague in India, and into malarial fever in Italy, Greece, and elsewhere. Among his appointments were those of member of the Imperial Board of Health, professor in Berlin University, and director of the

new Institute for Infectious Diseases. In 1905 he was awarded the Nobel Prize for medicine. Among his works are: *On Cholera Bacteria*; and *Diagnosis, Treatment, and Prophylaxis of Tropical Malaria*.

Kock, Charles-Paul de, French novelist, born 1794, died 1871. He wrote an immense number of novels which had a great popularity, and have yet a certain value as pictures of low and middle-class Parisian life during the first half of the nineteenth century. Among his works are: *Georgette*; *Gustave le mauvais sujet*; *Le barbier de Paris*; *André le savyard*; *La femme, le mari, et l'amant*. Besides his novels, he wrote some dramas, chiefly adapted from them.

Kohat', a town of India, head-quarters of the district of the same name in the North-West Frontier Province. Pop., including suburbs and cantonments, 30,762.—The district has an area of 2771 sq. miles, and a pop. of over 200,000. There are rich deposits of rock-salt, some petroleum springs, and sulphur-mines.

Kohl-rabi, a cultivated variety of the cabbage, distinguished by a swelling at the neck of the root, which is eaten, and in its qualities much resembling Swedish turnip. It is valuable as a cattle food, but is not much cultivated in Britain.

Kokra Wood, the wood of *Aporosa* or *Lepidostachys Roxburghii*, a tree of the Spurgewort family (Euphorbiaceæ), a native of India, used for making flutes and other musical instruments, and for general turning purposes.

Kola, a seaport of Russia, in the government of Archangel, on the Kola, near its mouth in the Bay of Kola. It is s. of Alexandrovsk, on the Murman Railway. Pop. 649.—The Peninsula of Kola lies between the Arctic Ocean and the White Sea, and its northern shore is called the Murman Coast.

Kola, or **Cola**, a genus of plants belonging to the nat. ord. Sterculiaceæ, a native of Western Tropical Africa. The *Kola* or *Cola acuminata* produces a fruit which consists of two, sometimes more, separate pods containing several seeds about the size of horse-chestnuts. The seeds have been found to contain caffeine, the active principle of coffee, as also the same active principle as cocoa with less fatty matter. A drink prepared from them is largely used in tropical Africa, and is said to have digestive, refreshing, and invigorating properties. The tree has been introduced into the West Indies and Brazil. The negroes of Jamaica are said to get quickly rid of the effects of intoxication by using the kola-nut.

Kola'ba, a British Indian maritime district, stretching south from Bombay for 75 miles; area, 2169 sq. miles; pop. 594,200.

Kolar', a district of the native state of Mysore,

Southern India; area, 3165 sq. miles; pop. 731,500. There are productive gold-mines (Mysore, Ooregum, &c.).—The capital, **Kolar**, is situated 43 miles E.N.E. of Bangalore. Pop. 8200. Kolar Gold Fields forms a municipality; pop. 48,000.

Kolding, a seaport of Denmark, east coast of Jutland, on the Koldingfjord, an inlet of the Little Belt. The battle of Kolding, between the Danes and the insurgents of Schleswig-Holstein, was fought in 1849. Pop. 14,219.

Kolhapur (kol-hä-pör'), a native Indian state, Bombay Presidency, under a rajah; area, 3217 sq. miles; pop. 883,441.—**Kolhapur**, the chief town, is a picturesque, thriving place, venerated for the antiquity of its sacred shrines. Pop. 48,120.

Kollin, or **Kolln**, a town of Bohemia, Czechoslovakia, on the Elbe, 35 miles east by south of Prague. It has manufactures of sugar, chemicals, &c. Frederick the Great was defeated here by Marshal Daun, 18th June, 1757. Pop. 16,000.

Kolome'a, a town and important railway junction in Eastern Galicia, 108 miles s.s.e. of Lemberg, on the right bank of the Pruth. Petroleum refining and pottery occupy the inhabitants. The scene of heavy fighting during the European War, the town was several times captured and recaptured by the Russians and the Austrians respectively. Pop. 42,000.

Kolom'na, a town of Russia, in the government of and 60 miles south-east of Moscow. It has manufactures of woollen, linen, soap, &c., and an important trade. Pop. 31,100.

Koltchak, V. V., Russian admiral and administrator, born 1875, died 1920. He joined the Russian navy in 1891, and was at Port Arthur (1904-5). In 1916 he was vice-admiral of the Black Sea fleet, and was arrested by mutineers and imprisoned during the Revolution of 1917. During 1917 he organized military forces, and in 1918 he set up a Royalist Government at Omsk and marched upon the Urals, where he won several battles against the Red troops. Eventually he was captured and shot by the Reds at Irkutsk, 7th Feb., 1920.

Kolyvan', a town of Western Siberia, in the government of Tomsk, near the left bank of the River Ob. Pop. 12,000.

Komorn', or **Komarno**, a town of Czechoslovakia, formerly in Hungary, at the confluence of the Danube and Waag, with some manufactures and a considerable trade. There is here a very strong fortress which has been repeatedly besieged. During the Hungarian insurrection of 1848-9 it was besieged by the Austrians and eventually capitulated. Pop. 22,337.

Konakry, a seaport on the west coast of Africa, Island of Tombo, and capital of French

Guinea. It is on the Kurussa-Kankan railway to the Niger.

Kong, a name formerly given to a non-existent West African mountain range, now recognized as a plateau having several isolated peaks, some about 5000 feet high.

• **Kong**, a district and town in the French Ivory Coast Colony, West Africa. District pop. about 47,000.

Kongolo, a town of Belgian Congo, on Lualaba (name given to Upper Congo) River. It is in communication by rail and telegraph with Kindu (220 miles), and possesses a wireless station.

• **Ko'nia**, or **Konieh** (ancient Iconium), a town in Anatolia, capital of a vilayet of the same name on an extensive plain; with industries and trade in carpets and silks. It is connected with the Bosphorus (Constantinople) and with Smyrna by railway, and is the starting-place of the Bagdad railway. Iconium was the capital of Lycania. See *Acts* xiv, 1-21, &c. Pop. 45,000.

Königgrätz (*keu'nih-gräts*), a town of Bohemia, Czecho-Slovakia, at the confluence of the Adler and Elbe. It is the see of a bishop, and has a (Gothic) cathedral, founded in 1302, and dedicated to the Holy Ghost. The battle of Königgrätz or Sadowa was fought on 3rd July, 1866, between the Austrians and Prussians, the former being totally defeated. This was the deciding battle of the Austro-Prussian War. Pop. 11,000.

Königinhof (*keu'ni-gin-höf*), now **Dvur Králové**, a town of Bohemia, Czecho-Slovakia, on the Elbe, where the *Königinhof Manuscript* of Czech national songs was unearthed in 1817. The Hussites attempted to take the town in 1421. Pop. 15,050.

Königsberg, a seaport town, capital of East Prussia, on the Pregel. It consists of three main parts—the *Altstadt* (old town), *Löbenicht*, and *Kneiphof*—situated on an island formed by the Pregel, besides extensive suburbs south of the river. An ornamental lake, covering 12 acres, lies between the Altstadt and Löbenicht. The principal public buildings are the fourteenth-century cathedral, restored in 1856, situated on the Kneiphof; the *Schloss*, begun in 1555, and formerly the residence of the Grand Masters of the Teutonic Order; the *Schlosskirche*, occupying a wing of the palace; the university, completed in 1862; the old university, founded in 1544 and attended in 1914 by 1700 students, having a library of 320,000 volumes, a zoological museum, and an observatory. Kant was a native of the town, and a bronze monument perpetuates his memory.

Königsberg entered the Hanseatic League in 1840, suffered much during the Seven Years' War by the occupation of the Russians from 1758 to 1764, and much more severely from the French,

who entered it in 1807 after the battle of Friedland. Before the European War the town was a fortress of the first rank, and was almost occupied by the Russians in their advance in 1914. Pop. (1919), 260,895.

Königshütte (*keu'nihs-hüt-é*), a town of Silesia, 5 miles from Beuthen, in the centre of the Silesian coal- and iron-fields. The inhabitants are chiefly employed in iron-working and mining, coal and iron being raised in large quantities, and also zinc. Pop. (1919), 74,811.

Konkan, the narrow coast-strip along the southern portion of Bombay Presidency, between the Western Ghāts and the sea. It includes the town and Island of Bombay, several small native states, and the Portuguese territory of Goa. Area, about 17,000 sq. miles; pop. 3,000,000.

Koodoo, or **Kudu** (native name), the striped antelope (*Strepsiceros kudu*), a native of South Africa, the male of which is distinguished by its fine horns, which are nearly 4 feet long, and



Koodoo or Kudas (*Strepsiceros kudu*)

beautifully twisted in a wide spiral. The koodoo is of a greyish-brown colour, with a narrow white stripe along the back, and eight or ten similar stripes proceeding from it down either side. It is about 4 feet in height, and fully 8 feet in length.

Koo'tenay, a river of the United States and Canada, which rises in the Rocky Mountains, passes through Montana and Idaho, flows through Lake Kootenay, afterwards joining the Columbia River. Considerable deposits of gold have been found in its basin. Length, 450 miles.

Ko'ran (*Al-Korân*, that is, *the Koran*, or *Quran*, which means originally 'the reading, or that which is to be read', from the Ar. *Qôrâ'a*, to read, to recite), the book containing the religious and moral code of the Mahomedans, and by which, indeed, all their transactions, civil, legal, military, &c., are regulated. It is thus the foundation of Islam, and the final authority in everything relating to the life of a Moslem. The *Koran* is also called *Alkitâb*, The Book; *Kitâbul-lâh*, The Book of God; and *Al-tanzîl*, The Revelation. According to the Mahomedan belief it is coeval with God, uncreated, eternal, and its first transcript was written from the beginning in golden rays on a gigantic tablet in the highest heavens, and portions were communicated by the angel Gabriel to Mahomet at intervals during twenty-three years. These were dictated by Mahomet to a scribe and kept for the use of his followers. After Mahomet's death they were collected into a volume by Zaid Ibn Thabit, Mahomet's disciple, at the command of Abu Bekr, Mahomet's father-in-law and successor. This form of the *Koran*, however, was considered to contain erroneous readings, and in order to remove these 'Aliph Othman caused a new copy to be made from the original fragments in the thirtieth year of the Hegira (A.D. 652), and then ordered the destruction of all the old copies. One copy of the new edition was kept at Medina, and one was sent to each of the chief cities of Islam—Basra, Kufa, and Damascus. These were the only authentic MSS., and all other editions were merely copies. The leading doctrine of the *Koran* is the Oneness of God, clearly laid down in the passage: "Say, God is one God; the Eternal God; He begetteth not, neither is He begotten; and there is no one like unto Him", which is said to have been revealed in answer to a question of the Kuraish concerning the attributes of the God of Mahomet. To Christ it assigns a place in the seventh or highest heaven, in the immediate presence of God, but he is simply regarded as one of the prophets—Adam, Noah, Abraham, Moses, Jesus, and Mahomet. The doctrines of good and bad angels, and of the resurrection and final judgment, are fully set forth, as is also God's mercy, which secures entrance into heaven and not the merits or good works of a man. The joys of heaven range from music and women (*houris*, q.v.) to the supreme joy of beholding God's face, while the pains of hell are depicted in vivid colours. Idolatry and the deification of created beings are severely condemned. Another dogma is set forth in the *Korân*, yet not explicitly, that of the unchangeable decrees of God. Mahomet used the doctrine of predestination with great success to infuse into his adherents undaunted courage, which elevated them above all perils. The

Koran prescribes prayer five times a day with the face turned towards the Kaaba, fasting, alms, and the pilgrimage to Mecca and the Hill of Arafat. Purification in running water, after a certain manner which is laid down, must precede prayer, and where water is unattainable dry dust or sand may be used, or even clay where the believer is wounded or sore. The prayer in most general use by Moslems is the *Fatihah*, which runs: "In the name of God, the Lord of the Worlds; the Compassionate; the Merciful; the King of the Day of Judgment. Thee do we worship and of Thee do we seek help. Lead us in the right way; the way of those to whom Thou hast been gracious, who have not incurred Thy wrath, and who go not astray." This is universally used as one of, or in addition to, the five prescribed prayers, and is equivalent to the Lord's Prayer of the Christian peoples. To give alms was always a particular trait of the Arabians, but Mahomet made it obligatory. In respect to the civil laws relating to polygamy, divorce, inheritance, &c., Mahomet followed step for step the laws of Moses and the decisions of the rabbis, only adapting them to the customs and prejudices of his countrymen. The *Koran* is written in prose, but the different parts of a sentence end in rhymes. In size it is about equal to the New Testament; it is divided into 30 *juzans*, subdivided into 114 *sûras* or chapters, which are separated by the phrase, "In the name of God", which forms the opening phrase of each *sûrâ*. The *sûras* are not arranged in chronological order, but deal with single subjects or parts of a subject. As the work was written at different times, in different moods, and on different occasions, there is naturally great diversity in the style of different passages. The language is considered the purest Arabic.—BIBLIOGRAPHY: J. M. Rodwell, *Koran* (translation in Everyman's Library); E. Sell, *Historical Development of the Quran*; W. Muir, *The Koran: its Composition and Teaching*; H. Hirschfeld, *New Researches into the Composition and Exegesis of the Quran*; W. St. Clair Tisdale, *The Original Sources of the Quran*.

Kordofan', a province of the Anglo-Egyptian Sudan. From 1821 to 1883 it formed one of the Sudanese provinces of Egypt, but at the latter date it was freed from Egyptian rule through the Mahdi's insurrection. It was recovered in Jan., 1884, and the Egyptian administration was again resumed in 1889. The surface is generally flat and the soil naturally fertile. The climate in the wet season, lasting from June to October, is extremely unhealthy; in the dry season, though healthy, it is intolerably hot. The principal articles of trade are gum, hides, senna, ivory, cattle, gold, salt, slaves, &c. Cultivation is almost wholly confined to *ducks*, a

species of millet. The inhabitants are of many nations, but they all speak Arabic. A railway from Sennar to El Obeid. Pop. 340,000.

Korea. See *Corea*.

Körner (keur'ner), Karl Theodor, German poet, born at Dresden 1791, killed 1813. He wrote the tragedies of *Rosamunde* and *Zriny*, and a large number of dramas for the Theatre Royal at Vienna, but owes his fame to his celebrated patriotic lyrics. In 1818, when Germany took up arms against Napoleon, Körner joined the famous Lützow corps of black hussars, and was fatally wounded in a skirmish near Gadebusch, in Mecklenburg-Schwerin. The collection of songs published soon after his death as *Leier und Schwert* (Lyre and Sword) contains some of the finest war-songs in any language.

Kornilov, Lavr Georgievitch, Russian general, born 1870, died 1918. The son of a Cossack officer, he was educated at the Military Academy, St. Petersburg (Petrograd), and subsequently travelled extensively. He is reputed to have served with the Boers during the Boer War, but repeatedly denied this, and explained that he was then in North-West India on behalf of the Russian Secret Service. He served in the Russo-Japanese War (1904-5), and was captured by the Austrians in 1914 (European War). On his escape from Austria he was made military Governor of Petrograd during the Revolution; was in conflict with Kerensky, dismissed from the High Command, and imprisoned (Sept., 1917). On the fall of Kerensky he organized the Kuban Cossacks, and was killed at Ekaterinodar (March, 1918) by a shell bursting over the house from which he directed the anti-Bolshevik campaign.

Kosciusko, Tadeusz, Polish patriot, was born in Lithuania, of an ancient and noble family, 12th Feb., 1746, and died at Soleure (Solothurn) 15th Oct., 1817. He went to America in 1777, where he attracted the notice of Washington, was appointed by him engineer, with the rank of colonel, and afterwards general of brigade. He did not return to Europe till three years after the conclusion of the Peace of 1783. For some years after his return he lived in retirement, but after serving in his own country under Poniatowski, he was appointed in 1794 generalissimo of the insurgent forces. He defeated the Russians at Racławice, near Cracow, but at the battle of Macziewice (10th Oct., 1794) his army was defeated and he himself wounded and taken prisoner. He remained in captivity for two years, but was liberated on the accession of Paul I of Russia in 1796. After visiting England, America, and France, he ultimately settled at Soleure, in Switzerland, where he continued to live in quiet retirement. In 1817 he issued from there a letter of emancipation to the serfs on his estate in Poland. In 1818 his body was removed

at the expense of the Emperor Alexander of Russia to Cracow, where it was buried in the cathedral, and where a monument was erected to him. A mound 150 feet in height, formed of earth from all the principal battlefields of Poland, was also raised to his memory in the vicinity of Cracow.—**BIBLIOGRAPHY:** L. J. B. Chodzko, *Biographie du Général Kosciuszko*; Monica M. Gardner, *Kosciuszko: a Biography*.

Kosciusko, Mount, New South Wales, the highest mountain in Australia (7328 feet), in the northern Australian Alps; it has a meteorological station.

Kosel, a fortress town of Silesia, on the Oder. It was besieged on four occasions between 1758-62, and again harassed in 1807. Pop. c. 8000.

Kosher, or **Kasher**, a Hebrew word meaning proper and fit. It is rarely used in the Bible (*Esther*, viii, 5). The word is especially applied to food, and particularly meat, which is considered proper to be eaten by orthodox Jews, such as meat of clean animals killed in accordance with rabbinical law. The term is also applied to the vessels in which proper food is prepared.

Köslin (keus'lin), a town in Prussia, province of Pomerania, 7 miles from the Baltic, and 85 miles north-east of Stettin. It has manufactures of paper, soap, bricks, and mineral waters. Pop. 28,000.

Koslov, **Kozlov**, or **Eupatoria**, a seaport, South Russia, in the Crimea. It manufactures soap and leather, and has some grain, wool, and salt trade. The annual fairs are held at the famous Troitzki monastery close by. Pop. 50,225.

Kossuth (kosh'shut), Lajos (Louis), Hungarian patriot, born at Monok, in the county of Zemplin, Hungary, 1802, died in 1894. He studied law, and in 1832 sat in the Pressburg National Diet. For persisting in publishing the debates of the Diet, he was condemned to four years' imprisonment (1837-40). In 1841 he became editor of the *Pesth Journal*, and in 1844 he founded a national league in opposition to the Viennese Government. In 1847 he was elected to the Diet by the National party, and secured the appointment of a responsible Hungarian ministry, in which he became Minister of Finance. During the Hungarian war for liberty he was chosen Governor or Dictator, but the intervention of Russia rendered all the efforts of the Hungarians unavailing. Kossuth resigned, was succeeded by Görgey (whom he accused of treachery), and was interned in Turkey (1849). He was released through the intervention of Britain and the United States; visited these countries and met with an enthusiastic reception. He was long regarded as the leader of the Irreconcilable party, but in 1884 he became reconciled to the Habsburg rule. His chief residence

in his latter years was at Turin, where he died.—Cf. W. R. Thayer, *Kosuth* (in *Throne Makers*).

Kostroma, an inland government of Russia; area, 32,432 sq. miles. Hemp and flax are largely grown, and the industries include the manufacture of silver and copper wares, leather, and chemicals. The forests are extensive. Pop. 1,855,000.

Kostroma, the capital of the government of the same name, stands on a height near the confluence of the Kostroma with the Volga, 56 miles east of Juroslav. It is an ancient place, and has a fine old cathedral situated in the Kremlin or former citadel. Kostroma university was established in 1919. It was at Kostroma that Michael, the first ruler of the House of Romanov, was elected Tsar in 1613. Pop. 73,820.

Kotah, an Indian native state in Rājputāna, under the political superintendence of a British agent. Area, 5084 sq. miles; pop. 630,089.—**Kotah**, the chief town, is situated on the River Chambal, and has a pop. of 52,000.

Kottbus, or **Cottbus**, a town of Prussia, province of Brandenburg, on the Spree, 70 miles S.E. of Berlin. It is a busy manufacturing town. The chief manufactures are cloth yarns, linen, hosiery, tobacco, toys, wool, and carpets. There are also breweries. Pop. 48,700.

Kotzebue (kol'ze-bé), August Friedrich Ferdinand von, a German dramatist, born at Weimar 1761, assassinated at Mannheim 1819. He wrote more than a hundred plays, a *History of Germany*, and other works, most of which are now forgotten. Two of his plays, *The Stranger* and *Die Spanier in Peru*, the latter adapted by Sheridan as *Pizarro*, used to be well known on the British stage.—Cf. Charles Rabany, *Kotzebue: sa vie, son temps, et ses œuvres*.

Koumiss, milk which has undergone alcoholic fermentation. It has a frothy appearance, and tastes somewhat like old buttermilk; the casein being present in the form of a very fine floating conculum. Koumiss was originally prepared in the steppes of Southern Russia, and is made from mares' milk, although skimmed cows' milk is generally used in Britain. It is valuable as a diuretic and as a body-builder, but good koumiss should not contain more than 2 per cent alcohol and 1 per cent lactic acid. See *Yoghurt*.

Kovno, now **Kaunas**, a town in Lithuania, 60 miles W.N.W. of Vilna, on the left bank of the Niemen or Memel. During the European War Kovno was captured by the Germans, under Eichhorn, on 17th Aug., 1915. The population, a great part of which consists of Jews, is 92,810.—The district of **Kovno** has an area of 15,500 sq. miles, and its population is 1,871,400.

Koweit, or **Koelt**, a sultanate on the north-western coast of the Persian Gulf, on a bay south-

west of the mouth of the Shatt-el-Arab. The seaport possesses shipbuilding yards and a good trade. Basra having become the terminus of the Bagdad railway, Koweit has lost some of its former importance. Pop. about 25,000.

Kraguye'vatz, a town of Serbia, on the Lepenitza, with a cannon and small-arms factory, powder-mill, and arsenal. Captured by the Austrians on 23rd Oct., 1915, it was retaken by the Serbians in Oct., 1918. Pop. (1914), 19,000.

Krakato'a, a small uninhabited volcanic island situated in the Sunda Straits, about equally distant from Java and Sumatra. Previous to the eruption of 1883 it measured 5 miles in length and 3 miles in breadth, and culminated in two elevations, the highest of which was known as the Peak of Krakatoa, and rose to a height of some 2750 feet above the sea-level. Krakatoa was the scene of an eruption in 1680, but from that time its history was uneventful till the eruption of 1883. In May of that year all the premonitory symptoms of activity were observed, and on 27th Aug. a gigantic explosion took place which actually blew up two-thirds of Krakatoa, and entirely altered the physical features of the island and the neighbouring coasts. An immense wave swept over the shores of the neighbouring islands, occasioning a loss of life estimated at 36,000. To the north two new islands appeared where prior to the eruption there had been from 30 to 40 fathoms of water. The sound of the explosions was heard over a vast area, as far away as Rodriguez (nearly 3000 miles) and Ceylon (2058 miles). Some of the dust caused by the explosions came into the higher layers of the atmosphere, and, being diffused over a large portion of the earth's surface, gave rise to beautiful sunsets for many weeks afterwards.

Krasnolarsk' (the Town on the Red Cliff), a town in Siberia, capital of the government of Yenisseisk, at the junction of the Yenissei and Katcha. Manufactures of leather are carried on, and there are also some gold-washings in the neighbourhood. The town is on the Trans-Siberian Railway, and was captured by the Japanese in 1918. Pop. 87,500.

Krasnovodsk', a Russian seaport on the eastern shore of the Caspian Sea, capital of the Transcaspien province, on a bay of the same name. It is the starting-point of the railway to Merv, Samarkand, &c. Pop. 7775.

Krefeld (krä'felt), or **Crefeld**, a town in Rhenish Prussia, in the government of Düsseldorf. It is the principal locality in Prussia for the manufacture of silks, velvets, and mixed silk goods. There are also manufactories of woollen, linen, and cotton cloth, wax-cloth, hosiery, soap, candles, paper, leather, chemical products, and tobacco. Pop. (1919), 124,325.

Krems, a town of Lower Austria, at the con-

fluence of the Krems and Danube, in a fertile wine-growing district. It is separated from the town of Stein by the suppressed Capuchin monastery of Una. Pop. 14,384.

Krem'sier, a town of Czecho-Slovakia, in Moravia, on the March. It contains a palace of the Prince-Bishop of Olmütz and a library of 25,000 volumes. Pop. 16,528.

Kreutzer, or **Kreuzer** (kroít'sér), an old German and Austrian coin. The German kreuzer was equal to the sixtieth part of the gulden or florin, or about a third of a penny. The Austrian coin bearing this name was the hundredth part of a florin, or equivalent to one-fifth of an English penny.

Kreuznach (kroits'náh), a town in Rhenish Prussia, district of Coblenz, on the Nahe, 21 miles south-west of Mayence. There are valuable mineral springs containing bromine and iodine, which are much resorted to for their curative properties in scrofulous and other complaints. Marble-polishing, wine-growing, and the manufacture of leather are among the chief industries. Pop. 23,000.

Kriegspiel (kréh'spêl; War-game), a game of German origin, played with maps on a large scale, and coloured metal blocks, on the same scale as the map, representing bodies of troops of various strength (brigades of infantry, regiments of cavalry, besides artillery, engineers, and administrative troops). The players are usually two on each side, and the game forms an exact miniature of tactical operations. It is played by alternate moves. Each move represents the lapse of two minutes, and rules are given to determine the distance that each branch of the service may move over in that time. When two bodies of men on opposite sides come into contact, the weaker in numbers and position is held to be defeated; but when they are equal in these respects, victory is determined to one side or the other by the use of a die. The game was a favourite one in the German army.

Krishna, in Hindu mythology, the eighth avatar of Vishnu and the most popular deity in the Hindu pantheon. The identity of Vishnu (q.v.) and Krishna is generally acknowledged in the *Mahabharata* (q.v.), *Harivamsa*, and the *Purānas*, the sources of his life and deeds. As Krishna, Vishnu is worshipped by millions of Hindus. He was ostensibly the son of Vasudeva and Devaki of the royal family of the Bhoja reigning at Mathura. The reigning prince at the time of his birth was Kansa, who, to prevent the fulfilment of a prophecy, sought to destroy the young child, but his parents, assisted by divine power, succeeded in baffling all his efforts. Every year of his life furnishes the subject of some legend, his story showing a remarkable resemblance to those of the Greek Heracles and

Apollo. After a series of adventures, he slew Kansa, mounted the throne, and was at last killed by the arrow of a hunter shooting un-



Krishna

awares in a thicket. Cf. W. J. Wilkins, *Hindu Mythology*.

Krish'nagar, a town of India, Nadia district, Bengal, on the left bank of the Jalangi River. It has a college affiliated to the Calcutta University, a collegiate school, a considerable trade, and manufactures of coloured clay figures. Pop. 23,500.

Kronenberg, a Prussian town, in the Rhine province, 4 miles south of Elberfeld, with iron-manufactories. Pop. 12,800.

Kroo, or **Kru**, a native race, West Africa. Noted as boat builders and hardy sailors. They are much employed for rough work on vessels trading on the Liberia coast. Their territory extends about 70 miles along the coast; they are a strong, brawny race, and very industrious.

Kropotkin, Prince Peter Alexeivitch, Russian geographer, author, and revolutionary, born at Moscow 1842, died 8th Feb., 1921. The scion of a powerful and ancient family, he was destined for the army, and entered the Corps of Pages, at St. Petersburg (Petrograd), in his fifteenth year. In 1862, his education being complete, he elected to join a Siberian Cossack regiment, and filled aide-de-camp and attaché posts successively at Chita and Irkutsk. He carried out a geographical survey in Siberia, went up the Sungari into Manchuria, and travelled extensively in Finland. Entering the University of St. Petersburg in 1867, he speedily developed revolutionary sympathies and joined the Petersburg revolutionary party and (1872) the International Society in Switzerland. He spread the cult of nihilism in

Russia to such an extent that he was arrested and imprisoned in the fortress of Peter and Paul (1874), from which he escaped (1876), and preached his doctrine throughout Switzerland, England, and France until his arrest and sentence of five years' imprisonment at Lyons in 1883. Agitation eventually secured his release, and he settled in London, but returned to Russia (under Bolshevik domination) in 1917 and died at Moscow. An anarchist and preacher of revolution, he reconciled his principles with those of an active and compassionate Christianity; he was a vigorous opponent, with both pen and speech, of coercion or violence, and the ideal government was represented by him as a federation of small communities wherein the individual would have an unrestricted field for the exercise of his own initiative. His works include: *Memoirs of a Revolutionist*; *Fields, Factories, and Workshops*; *Orography of Asia*; *Russian Literature*; *The Conquest of Bread*; and *The Great French Revolution*.—Cf. V. Robinson, *Comrade Kropotkin*.

Kruger (krō'gēr), Stephanus Johannes Paulus, President of the South African Republic (Transvaal), was born in Cape Colony in 1825, died in Switzerland 1904. He migrated in the 'great trek' of the Boers in 1837, and settled in the Transvaal, where he became prominent in military and civil affairs. He was President from 1883 till the annexation in 1900.

Krupp, German family, famous as founders and directors of the Krupp works at Essen. Friedrich Krupp, born 1787, died 1826, was a native of Essen, and was employed in one of the steelworks there. He experimented in the production of cast steel, and, in partnership with another man, he started a small forge (1812), which, however, did not meet with the instant success they had expected. At the death of Friedrich Krupp the forge employed about a hundred hands, and was left almost entirely under the control of Frau Krupp, his widow, and her fourteen-year-old son, Alfred, under whom the business gradually developed until, in 1847, a three-pounder muzzle-loading gun, made of cast steel, was produced. From that time Krupp marched triumphantly from one success to another, eventually exhibiting in London (1851), at the Great Exhibition there, a cast-steel ingot, solid and flawless, weighing upwards of 2 tons. This exhibit practically revolutionized the industrial world; the Bessemer-steel process, steam-hammer, and weldless steel tyres for vehicles were perfected and adopted. Steel guns began to be made by Krupp in quantity, and when Alfred died in 1887, his son, Friedrich Alfred Krupp, began to acquire iron- and coal-mines to ensure a steady supply of these articles for the use of the ever-expanding steelworks. By him also was the financial aspect reviewed and

adjusted, and when he died (1902), his daughter, Bertha, turned the business over to a company under the directorship of Dr. Gustav von Bohlen und Halbach, whom she married in 1906, and who assumed the title of Krupp von Bohlen und Halbach.

In 1912, at the time of the centenary, Krupp controlled over 500 mines and quarries, and had factories at Annen, Rheinhausen, and elsewhere, besides the gigantic steelworks at Essen, where a staff of 70,000 men and women were employed. They also controlled the famous Germania Shipbuilding Yards at Kiel-Tegel, and supplied armour-plate, guns, and shells to half the nations of the world. During the European War Essen was a vital, vulnerable spot in the German armour, for upon Krupp's 120,000 workers depended almost entirely the artillery and general mechanical efficiency of the Prussian army. On the collapse of the Germans in 1918 the works were reorganized, and now manufacture engines, cars, and machine-tools. See *Industrial Villages*; *Essen*.

Kshat'riyas, the second or military caste in the social system of the Brahmanical Hindus, the Brahmins being the first and the Vaisyas and Sudras the third and fourth. The natural duties of the Kshatriyas are bravery, generosity, rectitude, and noble conduct generally.

Kuban, a republic of Ciscaucasia, which proclaimed its independence (1918) apart from association with Bolshevik Russia, and which was for some time in touch with Koltchak (q.v.). The administrative town is Ekaterinodar, and the republic has a total area of 30,500 sq. miles, produces petroleum, coal, and silver, and has a trade in cereals, timber, and salt. The Kuban River, rising in Mount Elburz and traversing the republic, is the *Hypanis* of ancient Circassian history.

Kubelik, Jan, Bohemian violinist, born near Prague 1880, of farmer parents; he appeared in public as a violinist when only eight years old. In 1900 he visited London, and toured America in 1902 and 1903, being hailed everywhere as the leading violinist of his day.

Küblai (kō'blā) Khan, Mongol emperor, founder of the twentieth Chinese dynasty, that of the Mongols or Yuen, born 1216, died 1294. In 1259 he succeeded his brother as Grand Khan of the Mongols, and in 1260 he conquered the whole of Northern China, driving out the Tartar or Kin dynasty, afterwards bringing Southern China under his domination also. Küblai thus became sole ruler of an empire extending over a large part of Asia, as well as over those parts of Europe that had belonged to the dominions of Genghis Khan. Marco Polo, who lived at the court of this prince, describes the splendour of his court and entertainments, his revenues, his

extraordinary paper currency, and his elaborate system of posts. Coleridge wrote a well-known fragmentary poem entitled *Kubla Khan*.

Kuching (kū-ching'), the capital of Sarawak, on the River Sarawak, Borneo; contains the residence of the Rajah, and has a European quarter, a wireless station, and carries on a considerable trade. Pop. about 30,000.

Kuen Lun, or **Kun-Lun**, a mountain range of Central Asia, stretching over a space of about 1500 miles, and forming in its whole length the north frontier of Tibet, as the Himálaya does that of the south. Several of its peaks reach an altitude of over 21,000 feet, and the numerous branches stretching towards the Indus form valleys down which immense glaciers descend.

Kuka, or **Kukawa**, a town in Western Africa, formerly the capital of Bornu, west of Lake Tchad, and in the Bornu province of Northern Nigeria. Pop. estimated at 60,000.

Ku-Klux-Klan, originally a secret society opposed to the measures introduced by the United States, pertaining to reconstruction and the abolition of negro slavery, after the Civil War of 1861-4. Formed in 1865 as a young white men's club at Pulaski, Tennessee, it developed into an all-America organization, having as its primary object the suppression of the negro in the United States. General Nathan B. Forrest, quondam Confederate cavalry leader, was its supreme *Grand Wizard*, who controlled the Klan's *Invisible Empire*, embracing the entire Southern States. Each state represented a *Realm*, each county was a titular *Province*, and smaller groups and units all had their individual titles, as had also the Klan officers, known variously as *Grand Dragons*, *Grand Cyclops*, or *Grand Titans* according to rank, and the ordinary members, who were simply *ghouls*.

In 1871 the Ku-Klux-Klan and all similar organizations were suppressed by an enforcement Act known as the *Ku-Klux Act* or *Force Bill*. However, as the blacks began to assert themselves in the South during 1915, and the United States then and subsequently formed a harbourage for all the dangerous spies and criminals of war-wrecked Europe, the Klan was revived with Colonel W. Joseph Simmons, of Atlanta, professor of history in Lanier University, as its *Imperial Wizard*.

Although a secret society, the Ku-Klux-Klan is officially advertised, and all efforts to probe its mysteries have failed hitherto. In 1920 a Congressional inquiry was held, but collapsed completely when an investigation was demanded of all secret societies, particularly the *Knights of Columbus* and the *Freemasons*.

Kulja, a town and district of China, East Turkestan, on the Ili River, an important caravan centre. The district was taken posses-

sion of by the Russians in 1871, but retroceded to China in 1881. Pop. 12,500.

Kulm (kŭlm).—1. A town of Poland, formerly in West Prussia, on the Vistula. It has manufactures of woollen cloth, and a trade in cattle. Pop. 11,000.—2. A village in Czecho-Slovakia, Bohemia, where, on the 29th and 30th Aug., 1813, a great battle was fought, in which the Allies (Austrians, Prussians, and Russians) totally destroyed a French army of 10,000 men under Vandamme.

Kulturkampf, a word first used by Professor Rudolf Virchow, and applied to the political struggle between the German Government and the Catholic Church. It started in 1870, immediately after the creation of the new German Empire, with Protestant Prussia as the leading state, and lasted for fifteen years. The Catholic countries of the German Union, such as Bavaria, Baden, and the Rhine provinces, were alarmed and afraid of religious persecution on the part of Protestant Prussia, and the new political party, called the Centre, with a view to protecting and safeguarding Catholic interests, was organized. The hostility, however, against the influence of the Church of Rome gradually increased, and reached its climax when the Vatican proclaimed the dogma of Papal infallibility. Many German Catholics, and especially the eminent theologian Dollinger, refused to acknowledge the new dogma, and were consequently excommunicated. They appealed to the Government, and Bismarck decided to avail himself of the opportunity to weaken the influence of the Roman Church. Between 1873 and 1875 the famous May laws, enacted by the Prussian Landtag, gave the State superiority over the Church, and power over the education of the Catholic clergy. In 1875, when civil marriages were made compulsory, the struggle became more acute, and the opposition of the Catholics more pronounced, the influence of the Centre increased, and the party became more consolidated. Bismarck had now to deal with a powerful opposition in the Reichstag, and although he had previously declared that he would "never go to Canossa", he opened negotiations with the new Pope, Leo XIII, and the majority of the laws of an anti-clerical nature were repealed.

Kum, or **Koom**, a town of Persia, 80 miles s.w. of Teheran; formerly a place of great magnificence, but destroyed by the Afghans in 1722. Pop. about 20,000.

Kumamo'to, a Japanese garrison town, on the Island of Kyushu, near Nagasaki. It had a famous castle which was burnt down during the Kagoshima Rebellion in 1877. Pop. 73,618.

Kuma'on, or **Kuma'un**, a division of British India, United Provinces, in the Himálaya; area,

13,725 sq. miles; pop. 1,828,790. Although mountainous, it has also a strip of lower ground or *tarai*. It consists of three districts—Garhwal, Naini-Tal, and Almora. The capital is Almora, and there are two hill stations, Naini-Tal and Ranikhet. There are extensive and valuable tea plantations, and the forests yield valuable timber.

Kuma'si. See *Coomassie*.

Kum Kale, a former Turkish fortress on the south shore of the Dardanelles. In April, 1915, the town was occupied by the French, for the purpose of covering the British landing in Gallipoli.

Kumquat, a very small variety of orange tree (*Citrus japonica*) growing not above 6 feet high, and whose fruit, of the size of a large gooseberry, is delicious and refreshing. It is a native of China and Japan, but has been introduced into Australia. In China it is preserved with sugar in jars, and forms an important export.

Kunduz, a state, town, and river of Afghanistan. The river rises in the Hindu Kush and flows into the Amu Daria. The state has a pop. of about 400,000.

Ku'nersdorf, a village in Prussia, in the province of Brandenburg, near Frankfort-on-the-Oder, the scene of the defeat of Frederick the Great by the combined Russian and Austrian forces 12th Aug., 1759 (Seven Years' War).

Kungur, a town of Russia, in the government of Perm. Here are the famous caverns of the *Ledinaya Gora* (ice-mountain), on the banks of the Iren. Pop. 14,000.

Kunigundé, Saint, daughter of Siegfried of Luxemburg, married Henry of Bavaria, afterwards Henry II of Germany. Accused of adultery, she is said to have vindicated herself by walking over red-hot ploughshares barefooted. After the death of her husband, in 1024, she entered the convent of Kaufungen, which she had founded, and died as a nun in 1037. She was canonized in 1200 by Innocent III, her feast being 3rd March.

Kur, or **Kura** (ancient Cyrus or *Kūros*), a river of Georgia-Azerbaijan, rises in the mountains west of Kars, and falls into the Caspian Sea, below Baku, after a course of 750 miles.

Kurdistan (*kür-di-stân*; 'Land of the Kurds'), a region south of Armenia, in West Asia, and extending from the Euphrates to Lake Urmia, and from Lake Van to Mesopotamia. The eastern part of Kurdistan forms the Persian provinces of Ardilan and Kermanshah, and the remainder is in Turkey, where, before the European War, it formed the principal part of the pashalic of Van, and a considerable part of that of Bagdad. In 1920 the abortive Treaty of Sèvres conferred autonomy upon Kurdistan. It is mountainous, containing considerable

forests of oak and other hard timber, and also numerous pastures, on which horned cattle, sheep, and fine-haired goats are reared, and in the valleys many fertile districts yielding rice, cotton, flax, fruits, and gall-nuts. It is drained by the Tigris and the Euphrates and their tributaries. The Kurds, to whom the territory owes its name, are not confined within its limits, but are found in considerable numbers eastward in Khorasan and over the hilly region of Mesopotamia, as far west as Aleppo and the Taurus. They are a stout, dark race, well formed, with dark hair, small eyes, wide mouth, and a fierce look. On their own mountains they live as shepherds, cultivators of the soil, and bandits, some being nomadic and others sedentary and pastoral. Their language is a dialect of Persian, now much mixed with Arabic and Syriac; their religion Sunnite Mahomedanism. Their numbers have been estimated at 2,300,000.—**BIBLIOGRAPHY:** F. Millingen, *Wild Life Among the Kurds*; H. F. B. Lynch, *Armenia*; E. B. Soane, *To Kurdistan in Disguise*.

Kuria Muria Islands, a five-island group close to the south coast of Arabia. They were ceded to Britain by the Imam of Muscat (1854), and are in the dependency of Aden. There are large guano deposits, but the islands are of more importance as a landing-place of the Red Sea cable. Area, 28 sq. miles (approximately).

Kurile Islands, or *Chishima*, a chain of thirty-two Japanese islands, North Pacific, extending in a northerly direction from Japan to Kamchatka; area, about 6200 sq. miles. The islands are of volcanic origin, and form part of the 'Pacific ring of fire'. Pop. about 5000.

Kuro'ki, Tamesada, Count, Japanese general, was born in 1844 at Saga, in the Island of Kyushu. In 1871 he was appointed captain in the imperial army, and in 1878 promoted to the rank of colonel. In the Chino-Japanese War he was present as commander at the taking of Wei-hai-wei (1895), and at the outbreak of the Russo-Japanese War he was member of the Imperial Council of War and commander of the First Army. His exploits in Manchuria proved him one of Japan's greatest generals. He was created a count in 1905. He died in 1928.

Kuropat'kin, Alexei Nikolaievitch, Russian general, was born in 1848, died in 1925. He entered the army, passed with distinction through the military schools, and was attached to the general staff in 1874. From 1874 to 1881 he served at various times in Algeria, Turkestan, Bulgaria, and Middle Asia. In 1898 he became Minister of War, in 1901 general of infantry. At the outbreak of the war with Japan (1904) he was appointed commander-in-chief in Manchuria. Here he met with continuous reverses, and in March, 1905, was compelled to flee from Mukden,

when he resigned his command. He commanded the Russian armies on the Northern front during the European War, and in 1916 was appointed Governor of Turkestan. He wrote *The Russian Army and the Japanese War*.

Kuro Shio (Jap., black tide), or **Japan Current**, the Gulf Stream of the Pacific, flows past Formosa, Japan, the Kuriles, the Aleutian Islands, and thence bends southwards to California. It is much inferior to the Gulf Stream both in volume and in temperature.

Kurrachee (ka-rā'chē), or **Karachi**, the third seaport of India after Calcutta and Bombay, on the coast of Sind, Bombay Presidency, at the western angle of the Indus delta, situated on a large and commodious inlet, forming a good harbour, safe in all winds, and out of the track of cyclones. The town, which is fairly healthy, came into British possession in 1842, and contains the Napier Barracks and the Dayaram Jethmal Arts College. A railway runs from Kurrachee to Lahore, &c., and is connected with the Rājputāna railway system. Pop. 151,900.

Kursk (kürsk), a government of Southern Russia; area, 17,937 sq. miles. The climate is mild and dry. Pop. 3,220,200.—*Kursk*, the chief town, on the Tuskora near its junction with the Sen, forms a railway junction from Moscow, Kiev, and Kharkov. There are two cathedrals and a monastery. Pop. 80,800.

Küstendji (küs-tend'ji), or **Constantza**, a Roumanian Black Sea port exporting petroleum and timber. Pop. 26,628.

Küstenland (küs'ten-lánt; 'Coast-land'), formerly, before the Treaty of St. Germain (10th Sept., 1919), an administrative division of the Austrian Empire, at the head of the Adriatic, consisting of the county of Gorz and Gradiska and the margraviate of Istria with the town of Trieste.

Küstrin (küs'trin), or **Cüstrin**, a town of Germany, in the Prussian province of Brandenburg, on the Oder, at the confluence of the Wartha. It contains a castle in which Frederick the Great, when Crown Prince, was confined by his father, Frederick William I, in 1730, and has manufactures of machinery, and brass and copper v
Pop. 17,600.

Kutais (kū-tā'is; ancient *Kotatislon*), a town in the Republic of Georgia, east of the Black Sea, on the railway between Poti and Baku, via Tiflis. Pop. 32,492.

Kuta'ya, or **Kuta'lah** (ancient *Cotyæum*), a town in Asia Minor, north-east of Smyrna, on the line between Constantinople and Konia. It is the centre of the Turkey carpet manufacturing district, and the terminus of a branch of the Bagdad railway. Estimated pop. 80,000.

Kut-el-Amara, a small town of Mesopotamia, on the Tigris, a coaling-station for the Basra-

Bagdad river steamers. The town is famous as the scene of the gallant defence of General Townshend after the retreat from Ctesiphon. See *European War*.

Kutu'sov, Mikhail Larionovitch, Prince of Smolensk, Russian field-marshal, born in 1745, died 1813. He served against the Poles and the Turks, and became lieutenant-general in 1789. He was successively Ambassador at Constantinople and Berlin, and in 1805 took command of the 1st Corps of the Russian army against the French. He defeated Marshal Mortier at Dörenstein, and commanded under the Emperor Alexander at Austerlitz. In 1812 he was in an indecisive action at Borodino, retreated, and forced Napoleon to retreat from Moscow. For his victories over Ney and Davoust near Smolensk he received the title of Prince of Smolensk.

* **Kuve'ra**, in Hindu mythology, the god of wealth. He resides in the splendid palace of Alaka, on Mount Meru.

Kuyp (koiip), or **Cuyp**, Albert, Dutch painter, born at Dordrecht 1605, died 1691. He studied under his father, Jacob Gerritsz Kuyp, a painter of some fame, and was much influenced by Jan van Goyen. He painted with great success landscapes, cattle, river scenes, portraits, and pictures of still life. Kuyp particularly excelled in his treatment of veiled sunlight and the golden glow of late afternoon and evening. He is at his best in landscape. His most important work is in England, and is well represented in the National Gallery and Wallace Collection.

Kwangsai, a province of Southern China. It is mountainous, and is watered by the numerous branches of the Sikiang and Kweikiang. Rice is grown, and gold, silver, and mercury are mined. Area, 77,200 sq. miles; pop. about 5,425,000.

Kwangtung, the most southerly coastal province of China. The northern part is mountainous, but the southern region is very fertile and rich minerally. It includes Hainan, Hongkong (Brit.), and Kwangchow (Fr.). The capital is Canton. Area, 99,970 sq. miles; pop. 23,700,000.

Kwantung, the southern part of the Liaotung Peninsula, Manchuria. It is part of the territory leased to Russia in 1898, transferred to Japan in 1905, and leased to Japan in 1915. It includes Port Arthur and Dairen. Wheat, maize, beans, rice, hemp, and tobacco are produced, and salt is manufactured. Dairen has an excellent harbour. Area, 538 sq. miles; pop. 907,549 (191,795 Japanese).

Kweichow, a province of South-West China. It is called the Switzerland of China, as about seven-tenths of the province is mountainous. It produces rice, tobacco, and timber, and has mines of copper, iron, lead, and mercury. Area, 67,160 sq. miles; pop. 9,265,000.

Kyd, Thomas, English Elizabethan dramatist,

born 1558, died 1594, was the son of a London scrivener, and was educated at the Merchant Taylors School. He published the *Spanish Tragedy*, which became popular in both Holland and Germany, and probably wrote the pre-Shakespearean play of *Hamlet*. He translated Garnier's *Cornelia*, was imprisoned by the Star Chamber (1593), put to the torture in Bridewell for sedition and heresy, and on his release fell into a state of abject poverty, which continued till his death. Kyd's works were collected by Professor F. S. Bous in 1901.

Kyrle (kér'l), John, philanthropist, surnamed

by Pope the *Man of Ross*, born in Gloucestershire 1637, died at Ross, Hereford, in 1724. His name is perpetuated in Pope's *Third Moral Epistle* (1732). Kyrle spent his life in building churches and distributing alms.

Kyrle Society, a British philanthropic association, the members of which belong to the well-to-do classes, and the object of which is to better the conditions of life for the poorer classes by laying out parks and encouraging gardening and house decoration. It was founded in 1877, and was named after John Kyrle. There are branches in most large towns.

L

L, the twelfth letter of the English alphabet, as usually denominated a semi-vowel or a liquid. **L** has only one sound in English. The nearest ally of **l** is **r**, the pronunciation of which differs from that of **l** only in being accompanied by a vibration of the tip of the tongue. There is no letter, accordingly, with which **l** is more frequently interchanged, instances of the change of **l** into **r** and of **r** into **l** being both very common in various languages. In fact in the history of the Indo-European alphabet **l** is considered to be a later modification of **r**.

Laaland (lò'l'àn), or **Lolland**, an island in the Baltic, belonging to Denmark; greatest length, south-east to north-west, 36 miles; breadth, varying from 9 miles to 17 miles; area, 402 sq. miles. The surface is everywhere flat, and the soil is very fertile, yielding good crops and excellent timber. The capital is Maribo, and the seaport Nakskov, with which it is connected by rail. Pop. of the island, 71,280.

Laar, or **Iaer** (lâr), Pieter van, called *Il Bamboccio*, Dutch painter, born in 1582, died at Haarlem in 1642. He lived for a long time at Rome, and returned to Holland about 1639. He generally painted lively scenes from peasant life, fairs, children's games, hunting scenes (whence his nickname comes), and landscapes. He is represented in the galleries of Amsterdam, Dresden, Florence, Munich, Vienna, and in the Louvre. Three of his paintings are at Hampton Court.

Lab'arum, the imperial standard adopted by Constantine the Great after his miraculous vision of the cross and conversion to Christianity, differently described and figured, but generally represented as a pole having a cross-bar with the banner depending from it and bearing the Greek letters XP (that is, *Chr*), conjoined so as to form a monogram of the name of Christ.

La Bassée, a town of France (Nord), manufacturing and mining centre. Early in the European War La Bassée was the scene of much

desperate hand-to-hand fighting, and was captured by the Germans on 22nd Oct., 1914. Battered by the heavy artillery of friends and foes alike, little was left of the town when hostilities ceased, and it was adopted by Preston, England, under the scheme whereby British towns assisted financially in rebuilding and repopulating the devastated area.

Labia'tæ, the mint tribe, a very important and extensive natural order of dicotyledons, with a gamopetalous corolla presenting a prominent upper and lower lip, and a four-lobed ovary, changing to four seed-like monospermous fruit nutlets. This order contains about 2800 species, mostly herbs, undershrubs, or shrubs with opposite or whorled leaves, usually square stems, and a thyrse or whorled inflorescence. They are spread throughout the world, and abound in all temperate latitudes. Many are valued for their fragrance, as lavender and thyme; others for their stimulating qualities, as mint and peppermint; others as aromatics, as savory, basil, and marjoram; several are used as febrifuges. Betony, ground ivy, horehound, and others possess bitter tonic qualities.

Labiche (là-bêsh), Eugène, French dramatist, born in Paris 5th May, 1815, died in 1888. In collaboration with other authors he brought out upwards of a hundred plays, many of them very successful. They are mostly distinguished by extravagant plots, and are full of droll situations. In 1880 he was elected to the Academy. Among his well-known plays are: *Le Voyage de M. Perrichon*, *La Poudre aux yeux*, *Les Petits Oiseaux*, and *La Cagnotte*. One of his plays, *Un Chapeau de paille d'Italie*, was adapted and turned into an operetta by W. S. Gilbert, the music for it being written by George Grossmith. It was first called *The Wedding March*, and rechristened *Haste to the Wedding*.

La'bium (Lat., 'a lip'), in zoology, a term applied to the lower lip of insects, the upper being called the *labrum*. It is made up of a

pair of jaws more or less completely fused together.

Lablache (là-blàsh), Luigi, celebrated basso singer, born in Naples 1794, died there 1858. He was educated in the Conservatoire at Naples, and in 1817 obtained great success as Dandini in *Rossini's Cenerentola*. He first visited Britain in 1834, and became very popular. His best character was Bartolo in *Il Barbiere*. He was not only a magnificent singer but a first-class actor.

Lab'oratory (literally a workshop), a room or building designed for investigation and experiment in chemistry, physics, engineering, biology, &c. It may be for special research and analyses, or for general work. To the former class belong the laboratories which are attached to dye-works, colour-works, chemical, and similar works. Laboratories are also attached to mining and metallurgical schools, to mints, to arsenals, &c. In 1825 Liebig founded the first important chemical laboratory at Giessen, and in 1845 Lord Kelvin established the physical laboratory at the University of Glasgow. Other institutions of the kind are the Cavendish Laboratory at Cambridge (opened in 1874), the National Physical Laboratory at Teddington (1902), and the Pasteur Institute in Paris.

Labouchère (lub'-q-shar), Henry, English politician and journalist, born 1831, died at Florence in 1912. Educated at Eton, he was in the diplomatic service from 1854 to 1864; became Radical member of Parliament for Windsor (1865-6), Middlesex (1867-8), and Northampton (1880-1905). In 1877 he started *Truth*, a weekly paper, which has become famous for its fearless criticism and acute censorship of public matters, and especially for its exposure of frauds and swindles.

Laboulbeniales, a family of Ascomycetous Fungi, very peculiar both in structure and in their mode of life. All are minute plants growing attached to the bodies of beetles and other insects, but apparently doing no damage to their hosts. Although they have typical asci, their mode of reproduction is otherwise very like that of Red Algae, a fact strongly suggestive of a real affinity between that group and the Ascomycetes.

Labour, Ministry of, a department of Government set up by the New Ministries and Secretaries Act, 1916, to take over the powers and duties of the Board of Trade in regard to Industrial Conciliation, Labour Exchanges, Trade Boards (see *Labour Legislation*), and Unemployment Insurance. The Labour Department of the Board of Trade, which collected and published statistics and information in regard to labour at home and abroad, employment, wages, prices, &c., has also been taken over, and the *Labour Gazette* is the organ of the Ministry of

Labour for information in regard to the duties transferred to it.

A special department of the Ministry of Labour deals with the Joint Industrial Councils ('Whitley Councils') formed in accordance with the recommendations of the Committee on Relations between Employers and Employed. These Councils, with Joint District Councils and Works Committees on similar lines, aim at dealing with industrial matters by mutual agreement between employers and employed. The number of Joint Industrial Councils grew from 20, representing 1,500,000 workers, on 1st Jan., 1919, to 51, representing over 3,000,000 workers, by the end of that year; 59, representing approximately 3,750,000 workers, were in active existence at the end of 1921, with a further 11 similar bodies in industries insufficiently organized for the full application of the Whitley scheme. Under the Industrial Courts Act, 1919, the Ministry of Labour set up a permanent court of arbitration, known as the Industrial Court, to which disputes which the parties (trade unions and employers' associations) have failed to settle can be referred, on the consent of both parties. This is the normal method contemplated, but alternatively the minister may, if the parties desire, appoint a single arbitrator or a special board of arbitration selected by the parties from the minister's panel. The minister is also empowered to establish a court of inquiry in the case either of existing or apprehended disputes; the consent of the parties is not required. The court will issue a statement of the merits of the dispute, and may offer suggestions as to its settlement.

Labour and Capital. In order to produce goods a man requires premises in which to work, materials on which to work, and the tools of his trade. He must also have a sufficiency of food and necessities to last until he has marketed his goods. This stock of prerequisites is the capital which his labour makes fruitful. In a primitive society the whole of the capital would be owned by the user, and until the industrial revolution created by the introduction of the steam-engine and the growth of the factory system, it might be said broadly that the capitalist was the worker. He was the owner of the workshop and the stock of tools with which, with a few helpers, he carried on his craft. The enormous development of the factory system led to the final separation of the capitalist and the 'proletarian' manual worker. But for some time the capitalist remained the working or managing employer. With the further growth of capitalism and the development of financial capital in the form of investment in joint stock companies came the divorce, now very general, between capital and management, as shown by the existence, side by side, in the normal under-

taking, of shareholders, a managing staff, and clerical and manual workers.

With the congregation of wage-earners under one roof the old method of individual bargaining, supplemented by custom or legal control, as means of fixing wages became impracticable and was gradually abandoned, its place being taken by collective bargaining through an accredited representative on behalf of all the men in the shop engaged on similar work. This grouping of workers for industrial action in a 'trade union' has been defined as "a permanent combination of wage-earners for the protection or improvement of their conditions of employment".

Associations of employers are of much later growth, but during the last quarter of a century there has been an enormous increase in their number and strength, accompanied by a corresponding movement towards federation and affiliation in each industry, and in 1919 by the formation of a National Confederation of Employers' Associations, for co-ordination in dealing with questions arising out of the relations between employers and their work-people.

Prior to the industrial revolution Parliament stood in a paternal relation to industry, but under the influence of the *laissez faire* theory, and under the anti-Jacobin influences caused by events in France, it met the movement towards combination of the industrial workers by the Anti-Combination Acts of 1799 and 1800. The Acts were, however, unevenly enforced, being almost dead letters in some regions, although strongly applied in others, so that trade unionism survived, and eventually, in 1825, the Acts were repealed. Since that time the trade unions have become the recognized channel for negotiating with employers. This advance in the status of working-class societies has been accompanied by the organization of semi-skilled and unskilled workers, women, and, more recently, of the so-called 'brain workers', over 60 per cent of the adult male wage-earners of Great Britain being trade unionists at the beginning of 1921. Parallel to this has been a continuous movement towards greater unity, not only within trades, but also between them, for common industrial and political action. After several abortive attempts this definitely began with the inauguration, in the middle 'sixties, of the Trades Union Congress, with a committee for parliamentary action, which has now become a General Council charged with co-ordinating and promoting action in the trade-union world. Trade unions also play a large part in the organization of the political Labour party.

In the main, organized labour has hitherto acted in a defensive capacity, concerning itself with wages, hours, and conditions of the working-classes, without questioning the validity of the

social structure of society. Extensive agreements, particularly about wages, have, as organization strengthened, been entered into between employers and employed in all the principal trades in the country, the machinery often developing into voluntary standing Conciliation Boards, meeting at regular intervals or as required. The method of payment agreed upon varies in each industry according to the character of the work. Thus in the cotton, boot and shoe, and coal-mining industries elaborate piece-price lists have been drawn up and are periodically revised; a standard time-rate is settled by carpenters and joiners, bricklayers, stonemasons, and painters; in printing and boiler-making both systems are worked side by side; tailors work to piece-work lists with a time-rate basis; while in the Cleveland blast-furnace industry and Midland iron and steel trade wages are regulated by a sliding scale, in which the standard wage varies according to the market price of the product.

These results were not achieved without many strikes, and in 1896 the principle of State assistance in settling disputes between employers and employed without strikes was endorsed by an Act authorizing the Board of Trade to settle disputes by conciliation or arbitration on appeal from the interested parties. This machinery has been further elaborated by the institution in 1919 of an Industrial Court, at which industrial cases may be heard on reference by the parties, which is usually secured by the intervention of the Ministry of Labour. The findings of the Industrial Court have, however, no legal force.

Compulsory arbitration and legal prohibition of strikes and lock-outs were introduced during the European War on the Australasian model, but have now been abolished owing to the unwillingness of employers and workers to accept compulsory findings; and though in some trades the rules of Conciliation Boards require that no stoppage of work should occur during negotiations, the right to strike or lock-out is always held in reserve as a last argument by both workers and employers. Though joint machinery greatly reduces the danger of small or localized disputes, strikes are much more dangerous when they do occur, through the greater efficiency of the opposing organizations and the possibility of sympathetic action by unions in kindred trades, e.g. the railway strike of 1919 and the coal strike of 1920. In practice, however, it has so far turned out that 'sympathetic action' by other unions has moderated the demands made by the workers, owing to the introduction into the dispute of parties less directly interested than the protagonists.

Since the repeal of the Combination Acts there has been increasing parliamentary interference in the relations between employers and

employed under pressure of public opinion and concerted labour action. To give a few instances, a legal minimum wage has been recognized in the Truck Acts, 1831 and 1887; the Trade Board Act, 1909; the Coal Mines (Minimum Wage) Act, 1912; and the Corn Production Act, 1917. Hours of labour have been successively reduced under various factory Acts. Safety and health have been guarded in the Employers' Liability Act, 1880; the Workmen's Compensation Act, 1897; numberless factory Acts regarding fencing of machinery, sanitation, and dangerous processes; and the National Health Insurance Act, 1911. The status of trade unions has been defined and funds protected by the Trades Disputes Act, 1906; and the Trade Union Act, 1871 and 1913. Security and continuity of employment were promoted by the Labour Exchanges Act (1900), the National Insurance Act (1911) Part II, and by the Unemployment Insurance Act of 1919, which covers all trades but agriculture and domestic service.

During the European War trade unionists as such were nominated conjointly with employers on nearly all Government advisory committees: distress committees in 1914, food rationing in 1917, and profiteering tribunals in 1919. They are also represented on the Tribunals of Appeal, which determine whether individual workmen are entitled to State unemployment benefit, and are part of the official machinery for administering both the National Health and the National Unemployment Insurance schemes.

Relations between labour and capital were originally confined to bargaining with regard to wages, hours, and conditions of employment generally. Now labour is endeavouring to extend its influence, and its relations to capital are being modified in the direction of joint control. Where the initiative has come from the employer's side, it has usually taken the form of bonus schemes, profit-sharing, and copartnership, worker members occasionally holding shares in the business and electing members to the board of directors (e.g. the South Metropolitan Gas Company), but control is nominal, and is generally introduced concurrently with scientific management and general speeding up of the workers. An official status has been given to the idea of joint control of industry by the Government's endorsement in 1917 of the formation of Joint Industrial (or Whitley) Councils in the well-organized industries, "to secure the largest possible measure of joint action between employers and work-people for the development of the industry as a part of national life and for the improvement of the conditions of all engaged in that industry". The Councils, which can only exist in any trade by voluntary agreement between employers and workers, are composed of equal numbers of

representatives of employers' associations and trade unions in the industry, and have a triplicate structure of national, district, and works committees, the last mainly concerned with welfare in the individual factory. Hitherto these Councils have been mainly occupied with wages, hours, regularization of production and employment, and the vexed problem of demarcation between processes and industries. They are, however, also interested in education, research, health, welfare, &c., and a valuable inquiry into methods of costing has been made by the Council for the Building Trade. At present decisions of the Council have no legal weight, but the problem of their legal enforcement is growing in importance. In many industries conciliation is dealt with separately by existing machinery, and most of the largest industries in the country, including cotton, coal, iron, engineering, ship-building, and mining, have failed to set up Joint Councils, pleading the adequacy of their present machinery for collective bargaining. By the end of 1921 over seventy Councils were in existence.

With the exception of Russia and Germany, other countries are less advanced in methods of collective bargaining than Great Britain. In Germany, since the Revolution, special provision has been made in the Constitution for the utilization of industrial knowledge by the constitution of District Economic Councils and a National Economic Council, composed of equal numbers of representatives of workers and employers in each industry, these bodies exercising close supervision over all legislative measures affecting the industry as well as general 'economic functions'. In addition, Works' Councils, District Workers' Councils, and a National Workers' Council, composed exclusively of workers, have been set up in each trade to protect the interests of those engaged in the industry. Similar joint councils of employers and employed, with a neutral chairman appointed by the Department of Industry, have been formed since 1919 in all the important industries in Belgium, and have been given legal status. The Mines Commission, instituted by royal decree in April, 1919, may be taken as an example. It consists of ten representatives of the Coal-owners' Association, eight representatives of the Socialist Miners' Union, and two of the 'Christian' Union. Its duties are to fix the hours of labour, wage scales, and general labour conditions for the industry. It has instituted district councils, local councils for each mining concern, and pit committees. Arbitration is not compulsory, but no strike may take place until two weeks have been allowed for attempts at the settlement of the dispute by conciliation. In France the labour policy is one of revolutionary syndicalism, and collective bargaining has not been developed to anything like

the efficiency it has reached in the United Kingdom. An Economic Labour Council has been formed by the trade unions, with a view to obtaining the ultimate control of industry. In Italy an attempt was made by metal-workers in 1920 to seize the factories in the northern towns. The attempt failed, but in 1921 Workers' Committees were set up in each factory by order of the State, with a certain amount of administrative and disciplinary power.

Labour Colonies have been founded in the United Kingdom at various times to alleviate unemployment. Noteworthy instances are the colonies which were established during a time of severe trade depression at Osea Island and Hadleigh Farm, in connection with the Mansion House Fund of 1903-4. Work was offered at some distance from London to London men who were prepared to leave their wives and families. The men were to live in lodgings provided near the work, be provided with board and pocket-money, while their wives received maintenance allowances. The work was mainly navvying. Several important principles were applied in setting up these colonies. Work was given—regular work and not money. The men were carefully selected according to their previous industrial record, while the relief given was less attractive than the man's ordinary employment, because he had to submit not only to separation from his family, but also to remuneration upon a lower scale.

Similar colonies were set up under the scheme for the relief of London unemployed introduced in 1904 by Mr. Walter Long, then President of the Local Government Board, the farm colony at Hollesley Bay, in Suffolk, being the most important. This farm colony was meant to remove men altogether from the urban labour market by training them for work on the land, and encouraging them to take small holdings.

On the Continent labour colonies have had a wider scope. Industrial training has been provided as well as field work. In some cases, too, e.g. in Belgium and Switzerland, men can be compulsorily detained. In England, on the other hand, no power of detention has been given, and no opportunity given for industrial training, while the colonies have usually been of a temporary character. It is thought by many writers that labour colonies might usefully be established on a permanent basis in this country to serve as institutions, in the first place providing technical and general training for men to whom it is desirable to teach a new occupation, and secondly, offering a more or less permanent home to the derelicts of industrial life. Labour colonies are recommended as a substitute for the workhouse, as they offer more varied methods

of treatment, and the work provided can be, to a large extent, in the open air. They should be suited to those whose unemployment is due to causes beyond their own control no less than to those with whom it is self-caused. Detention colonies similar to the penal colonies in Belgium and Switzerland would also be a useful means of dealing with the 'work-shy' and the loafer, for whom the present method of imprisonment is unsuitable.

The most notable example of a Scottish labour colony is at *Palacerigg*, instituted many years ago by the Glasgow Corporation, and at one time the most extensive colony for the relief of unemployment in Great Britain. Under the Ministry of Agriculture a scheme has been outlined for the creation of labour colonies upon the identical system, a group of small-holders forming, in this case, a colony under a central controller and adviser.

Labour Legislation. Unfettered industrial competition, by making success dependent on the cheapening of production, acts as a constant incentive to nibbling at the price of labour, whether by direct cuts in wages, by the lengthening of the working day, or by recourse to the 'pocket-money' labour of women and children. The result, as was seen in England in the early years of last century, is gross exploitation of the most defenceless workers—the women and children, and the men without special skill. It was a common regret of the better employers that they were subjected in this way to unfair competition on the part of those who were less scrupulous. Thus, long before the right of workmen to organize in their own defence was conceded in this country, it was recognized that the freedom of employers must be limited by legislative regulation of the terms and conditions of employment. It is now over a hundred years since Robert Owen fought against the 'white slavery' of little children in factories in his agitation for Sir Robert Peel's Factory Bill, which became the Act of 1819. The body of protective labour legislation now in force is of three main classes, affecting the legal, social, and industrial aspects of employment. The Truck Acts, 1831, 1887, and 1896, require the payment of wages in coin, and forbid any stipulation as to where, how, or with whom they shall be spent. The attachment of workmen's wages is forbidden by an Act of 1870. The Employers' Liability Act, 1880, rendered employers liable for damages for injuries suffered by their work-people owing to negligence on the part of the employers or their subordinates, while the Workmen's Compensation Acts of 1897, 1900, and 1906 provide for compensation for injuries (including industrial diseases) irrespective of negligence of the employer or his agent. The

National Insurance Acts, 1911 to 1916, provide for insurance against sickness and unemployment; the national organization of labour exchanges was set up under the Labour Exchange Act of 1909. The Conciliation Act, 1890, empowered the Board of Trade to take steps to promote the settlement of labour disputes. The Act is permissive only, organized labour in this country being against compulsory arbitration. The powers and duties of the Board of Trade under this Act, and in regard to labour exchanges, trade boards, and unemployment insurance, were transferred to the Ministry of Labour by the New Ministries and Secretaries Act, 1916.

Modern British factory legislation begins with the Act of 1819 already mentioned. Under this Act the employment in cotton- or woollen-mills of children *under nine years of age* was prohibited, and the working day for those under sixteen limited to twelve hours. In 1833 the hours of work of children *under eleven* were limited to forty-eight weekly, and of young persons *under eighteen* to sixty-nine. The Act of 1833 endowed the administration with four factory inspectors, the beginning of the elaborate system of to-day. Women's employment was first dealt with in the Act of 1844, which also introduced the 'half-time' system, limiting children's employment to thirty-three hours in the week. In 1847 the working day was limited for women and young persons to ten hours; this had the result of making the ten-hour day general in textile factories.

These Acts applied to textile factories only. Their provisions were made applicable to various other industries in 1860-4. In 1874 the minimum age at which children might be employed was raised to ten, and not until 1889 was it indirectly raised to twelve by the Elementary Education Act, which made full-time school attendance compulsory up to that age. The Factory Act of 1891 placed the sanitation of factories and workshops under the control of the Local Sanitary Authorities, and made more stringent the safety rules and the regulations for the protection of workers in lead-factories and other factories or workshops certified as dangerous to health. This Act was in part a result of the International Labour Conference at Berlin in 1890. In 1895 laundries, and docks, wharves, and quays were brought within the scope of the Factory Acts. The existing factory legislation was further amended and consolidated by the Factory Act of 1901.

The regulation of employment in mines begins with the Mines Act of 1842, which prohibited the employment underground of women and girls, and of boys under ten. Rules concerning safety in mines were first embodied in legislation in 1855. The existing laws were consolidated

in the Act of 1887, which remains the basis of the regulation of employment in mines.

The Factory Acts mainly affect classes of work-people who have achieved an advanced stage of trade union organization, such as miners and cotton operatives. The other end of the scale was reached by the Trade Boards Act, passed in 1909 virtually without opposition, under which certain classes of workers were to be 'scheduled' by the Board of Trade (now by the Ministry of Labour), as requiring the regulation of the rates to be paid for time- and piece-work. This regulation is entrusted to joint boards of employers' and workers' representatives. The chain-making trade was the first dealt with, and a number of others have since been scheduled. The rates fixed by the boards are obligatory upon the trade. The employment of children otherwise than in factories is governed by the Employment of Children Act, 1903, under which by-laws may be made by local authorities. BIBLIOGRAPHY: Abraham and Davies, *Law Relating to Factories and Workshops*; B. L. Hutchins and Harrison, *A History of Factory Legislation*.

Labour Party. The present Labour Party had its origin in the Labour Representative League, founded in 1869. Five years later the power of the League was still so limited that of fourteen candidates presented to the polls in 1874, only two were returned. In 1892 the number of elected representatives had increased to fourteen, the progress indicated being due less to the formation of the Labour Electoral Committee in 1880 than to persistent Socialist propaganda. In 1893 was formed the offshoot known as the Independent Labour Party. A conference of the Labour Party took place in London in 1900, and resulted in the formation of the Labour Representation Committee, which may be regarded as the direct ancestor of the present party. The aim of the body at this period was not so much a definite alliance with any existing political group as the maintenance of an independent attitude which would leave it free to support, when occasion offered, whichever side held out the greatest inducement. In 1906 fifty Labour candidates presented themselves at the polls, and of these twenty-nine were returned to Westminster, where, for the first time, they formed a recognized political group. About the same period the party became less exclusively that of the manual worker, members of intellectual callings being admitted to its ranks. Among the main planks on which the Labour Party takes its stand are: a national minimum standard of life; democratic control of industry; a better system of national finance; a levy on capital, with the application of surplus wealth to the common good. It is, further, a

steady supporter of a policy of international peace, and an inveterate opponent of imperialism. At the general election of 1918 seventy-four Labour members were returned to Parliament, of whom eleven were recognized supporters of the Coalition. The twenty-first annual conference of the party was held at Brighton in June, 1921. It refused to admit the Communist Party to affiliation. A National General Council of fifteen members, consisting of representatives from the Labour Party, Trade Union Congress, and Labour members of Parliament, will endeavour to find a common policy of action for the bodies represented. The secretary of the Labour Party is the Rt. Hon. Arthur Henderson, M.P.

Labrador, Canadian peninsula, the most easterly part of the American continent; area, about 500,000 sq. miles. It is divided between Quebec and Newfoundland, the former having annexed Ungava in 1912. The interior is occupied by the Labrador Plateau, some 2000 feet high, and by extensive forests. The territory under the government of Newfoundland extends in a narrow Atlantic coastal-strip from Newfoundland north-west to Hudson Strait, and has an area of about 120,000 sq. miles. Pop. (1919), 3647. The climate is rigorous, and no ordinary cereal can be grown; but the Labrador cod-fishing and the famous lobster-fisheries employ annually some 30,000 hands. The population is mainly Eskimo, with some Algonquin Indians and a few whites, and there are several Moravian mission stations on the coast. Labrador was annexed by Britain in 1763.—**BIBLIOGRAPHY:** H. Y. Hind, *Explorations in the Interior of the Labrador Peninsula*; W. T. Grenfell, *Labrador: the Country and the People*; W. G. Gosling, *Labrador*.

Labradorite, or **Labrador Felspar**, a mineral found in a coarse-grained gabbro on the coast of Labrador, where it reveals a fine iridescent shimmer through the occurrence of minute plates of hematite regularly arranged in planes in its interior. Labradorite is the common felspar of gabbro and basalt throughout the world.

Labridæ, the wrasses, a family of spiny-finned marine fishes, having the genus *Labrus* as the type. They are found on all temperate and tropical coasts, are usually of brilliant colour, and sometimes make nests. They possess strong crushing teeth. A well-known British species is the striped or cuckoo wrasse (*Labrus mixtus*), of red and yellow colour, with longitudinal blue stripes in the male.

Labuan, an island of the Malay Archipelago, annexed by Britain from the Sultan of Brunei in 1846, and administered by the Straits Settlements since 1907. It has an area of 28½ sq. miles; the interior is hilly and the soil fertile; but

the annual rainfall is very heavy, varying in average from 24 inches (spring) to 40 inches (autumn), with 28 and 36 inches in summer and winter respectively. The capital is Victoria, and has exports of sago. Coal was mined in the island until 1911. Pop. (1918), 6848, mainly Malays and Chinese.

Laburnum, a tree of the genus *Cytisus*, the *C. Laburnum*, nat. ord. Leguminosæ, a native of the Alps, much cultivated by way of ornament.



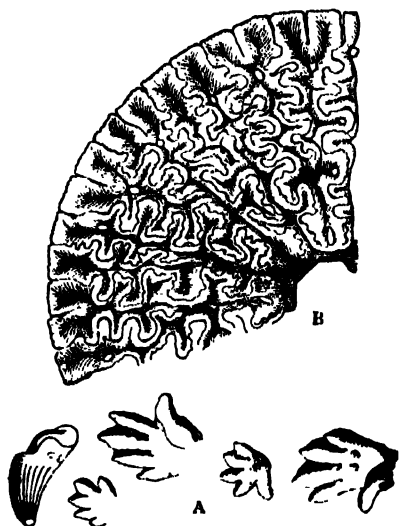
Laburnum (*Cytisus Laburnum*)

It is well and widely known for the beauty of its pendulous racemes of yellow pea-shaped flowers. The seeds contain a poisonous substance called cytisine, and are violently emetic. The wood is much prized by cabinet-makers and turners, being wrought into a variety of articles which require strength and smoothness.

Lab'yrinth, a structure having numerous intricate winding passages, which render it difficult to find the way through it. The word is probably derived from the Greek *laura*, a lane. The Egyptian, Cretan, and Samian labyrinths of antiquity were famous. The legendary labyrinth of Crete, out of which no one could find his way, but became the prey of the Minotaur, was said to have been constructed by Dædalus. The hint of this legend was probably given by the fact that the rocks of Crete are full of winding caves. The Egyptian labyrinth was a building

situated in Central Egypt, above Lake Morris, not far from Crocodilopolis (Arsinoe), in the district now called the Fayoum. The building, half above and half below the ground, contained 3000 rooms. It was probably a place of burial. The labyrinth at Clusium, in Italy, was erected by the Etruscans, according to Varro, for the sepulchre of King Porsenna. There were other labyrinths at Lemnos and Samos, but their sites are unknown. Imitations of labyrinths, called mazes, were once fashionable in gardening. They were made of hedges of privet, or some similar shrub. The best known is that at Hampton Court.

Labyrinth'odon, a genus of fossil amphibians, whose remains are found in the Carboniferous, Permian, and Triassic formations, those of the



A, Tooth and footprints (reduced). B, Cross-section of part of tooth (enlarged). After Owen.

Trias which are found in England being the largest. Some attained great size, the skull of *Mastodonsaurus* being 3 feet long. The name is derived from the labyrinthine structure of a section of the tooth, owing to the infolding of the cement from the outer surface. Footprints of *Labyrinthodon* resembling impressions of hands gave rise to the name *Cheirotherium*.

Lac, Lak, or Lakh, from the Sanskrit *laksha*, that is, 100,000. In India it is applied to the computation of money. Thus, a lac of rupees is 100,000. One hundred lacs, or 10 million rupees, are a *crore* (Sanskrit *koti*).

Lac, a resinous substance produced upon numerous Indian trees by an insect, *Coccus ficus* or *Coccus lacca*. The finest is found on the palas or dhak (*Butea frondosa*), the peepul (*Ficus*

religiösa), and the koosum (*Schleichera trijuga*). It is composed of five different varieties of resin, with a small quantity of several other substances, particularly a red colouring-matter. It is formed chiefly by the female insects, each of which inhabits a cell, the incrustation of which seems intended to serve as a protection for the young. When the covering is complete, the eggs are laid and the mother dies. The young break their way out, swarm on to the bark, and immediately commence the secreting of lac. In India the cultivation of the lac insect has received much attention. *Stick-lac* is the substance in its natural state, encrusting small twigs. When broken off and washed with water, it almost entirely loses its red colour, and is called *seed-lac*, from its granular form. When melted and reduced to a thin crust, it is called *shellac*. Mixed with turpentine, colouring-matters, and other substances, lac is used in the manufacture of coloured sealing-wax. Dissolved in alcohol or other solvents, it constitutes various kinds of varnishes and lacquers. *Lac-dye* and *lac-lake* are colouring-matters used in dyeing cloth scarlet, obtained by different processes from stick-lac. In the state in which they are found in commerce they have the form of little cakes. They were formerly obtained only from the East, but a superior kind of lac-dye is now manufactured in England from stick-lac. The colouring-matter of lac-dye is analogous to cochineal.

Lac'cadive Islands, a group of fourteen coral islands, British, in the Arabian Sea, off the Malabar coast of India; 11° 20' N., 72° 31' E. They were discovered by Vasco da Gama in 1498, and were attached to the Madras Presidency in 1875, the northern islands being administered by S. Kanara, and the southern by the collector of Malabar. Nine of the Lac'cadives are inhabited, and are covered with coco-nut plantations that yield coir or coco-nut fibre, which is soaked in the island lagoons by the natives, and is the staple product. They cover an approximate area of 80 sq. miles, and have a pop. of about 10,000, mainly Mahomedan. The language is Malayalam or Mahl.

Lace, a kind of ornamental open-work, formed of silk, flax, or cotton thread. It is made either by hand or machine, the former being produced by the needle, or made on the pillow. Needle laces are called *point*, those made on the pillow, *cushion*, *bobbin*, or *bone laces*. A prominent feature in all laces is the pattern or ornament; this may be worked either with or without a groundwork. Pillow lace consists of hexagonal meshes, four of the sides of each mesh being formed by twisting two threads round each other, and the other two sides by the simple crossing of two threads over each other. The pattern on parchment or vellum is attached to

the pillow, and pins are stuck in the lines of the pattern, round which the threads are plaited and twisted so as to form the required design. Among the laces of this class are Honiton, Buckingham, Mechlin, Valenciennes, &c. Point laces, made entirely by the needle and single thread, are known as Brussels, Alençon, Maltese, &c. Guipure lace consists of a network ground on which patterns are wrought in various stitches with silk, &c. It was originally a lace made in



Mechlin Lace

From a specimen in the South Kensington Museum

silk, thread, &c., on little strips of parchment or vellum. At Nottingham and elsewhere imitations of lace are produced by machines, called point net and warp net, from the names of the machines in which they are made. They are both species of chain work, and the machines are varieties of the stocking-frame. The manufacture of lace appears to have existed from a considerably remote antiquity, as in the representations of Greek women's dresses which have come down to us the garments are frequently ornamented with lace of beautiful patterns. In modern times point lace originated in Italy, from which the manufacture spread to Spain and Flanders. Pillow lace was first made in the Low Countries. **BIBLIOGRAPHY:** Mrs. J. H. Pollen, *Seven Centuries of Lace*; William Felkin, *Hosiery and Lace*; F. Nevill Jackson, *History of Hand-made Lace*.

Lace-bark Tree (*Lagetta linearia*), a tree of the nat. ord. Thymelaeaceae or Daphne family, is a native of the West Indies. It receives its common name from the fact that when its inner bark is cut into thin pieces, after maceration it assumes a beautiful net-like appearance. It is used by women by way of ornament, and the negroes manufacture matting from it.

Lace-wing Flies, Stink Flies, or Golden Eyes, insects of the genera Hemerobius and Chrysopa, ord. Neuroptera, with delicate gauzy wings. Their eyes have a metallic sheen, and the eggs are supported on slender stalks. The larvae are exceedingly voracious, and feed upon aphides.

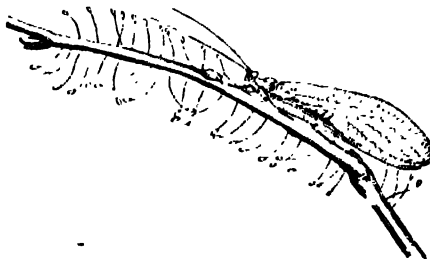
Lachine (là-shên), a town of Canada, Quebec province, situated on Montreal Island, 8 miles from Montreal, with which it is connected by an electric railway. It is a favourite summer-resort, and has stations on both the Canadian Pacific Railway and the Grand Trunk Railway (now Canadian National Railway). The Lachine Canal runs to Montreal, and avoids the rapids of the St. Lawrence at this point. These rapids supply power to the Montreal and neighbouring factories. In 1668 the place was sarcastically dubbed *La Chine* because the owner, Robert de la Salle, imagined it was on the direct route to that country. Pop. 10,000.

Lachlan, a river of New South Wales, Australia, joins the Murrumbidgee, and the united streams merge with the Murray 40 miles lower down; total length, 700 miles.

Lachmann (läh'màn), Karl, German critic and philologist, born at Brunswick 1793, died at Berlin 1851. He studied at

Leipzig and Göttingen, became a professor at Königsberg in 1818, and at Berlin in 1827. His edition of Lucretius was of service to H. A. J. Munro, whose edition superseded it. Lachmann also published valuable editions of old German classics, such as the *Nibelungenlied* and the works of Walther von der Vogelweide.

La Condamine (là kon-dà-mên), Charles Marie, French traveller and mathematician, born at Paris 1701, died 1774. He joined the army, but soon resigned, and devoted himself to the sciences. In 1736 he was chosen, with Godin and Bouguer, to determine the figure of the earth, by measurements to be made in the equatorial regions of South America, and he remained abroad for eight years. In 1748 he was elected

Lace-wing Fly (*Chrysopa vulgaris*)

a Fellow of the Royal Society of London, and in 1760 a member of the Academy of Sciences of Paris. His principal works are: *Distance of the*

Tropicks, La Figure de la Terre, Journal du voyage fait par ordre du roi à l'équateur, and Mémoires sur l'acclimation.

Lacquering, the application of coloured varnishes to metallic and wood articles. The term is derived from lac (q.v.), which is the basis of all true lacquers. In early days the Chinese were the greatest artists in lacquer, but about the beginning of the sixth century the process was introduced to Japan, where the development was very rapid, new ideas were introduced, and the later finest work was produced. The article to be treated is usually made of fine white pine. It is first sand-papered to a good surface, sized, and then the lacquer is applied in coats, each allowed to dry before the next is applied. Gold, mother-of-pearl, and other materials are sometimes affixed after the applications of the coloured lacquers are completed. Parts to be shown in relief are built up with putty and lac. The colouring matters are introduced into the lacquers before use. The skeleton markings of leaves and flowers, and grainings, are inserted after the later coats, and transparent lac varnishes are used to finish.

La Crosse, a city of the United States, Wisconsin, on the Mississippi at the confluence of the Black and La Crosse Rivers, a great railway centre and lumbering-town, with grain elevators and flour-mills. Settled in 1841, it became a city in 1856. Pop. 30,363.

Lacrosse, the national ball game of Canada, where it originated with the Indians, and was copied and modified by the French Canadians. The name is derived from the resemblance of the 'crosse' to a bishop's crozier. At first the game was a very rough one, but in 1867, when it became a national institution, a representative body, the National Lacrosse Association of Canada, was formed, and definite rules were established and enforced.

The game is very popular in the London clubs and in south Lancashire. International matches are no longer held, but the annual contests between North and South take their place, and the competitions for the premier positions or flags in these sections are keenly contested. The North has most teams, and shows considerable superiority in the championship and North v. South matches. Oxford and Cambridge award a half-blue for lacrosse and hold an annual match.

The crosse is a stick with a curved end to which is attached, fairly tightly, a triangular-shaped network of strips of leather (leaders) interlaced with coarse catgut, in the meshes of which the ball cannot be entangled, nor can the entire network act as a bag. The ball is of spongy india-rubber, approximately 8 inches in circumference, and weighing $4\frac{1}{2}$ to 5 oz. The shoes worn

by the players must be rubber-soled, and without spikes or bars.

The goals are 6 feet high, each with a horizontal cross-bar of the same length. The distance between the goals is arbitrary, though officially between 120 and 150 yards. There are no boundaries of play as in football, nor is there any rule relating to offside. The object of the game is to score goals by catching the ball in the net of the crosse, running with it, and propelling it by means of the crosse into the goal.

Twelve players constitute a team, which is composed of six players constituting the defence, and designated goal, point, cover-point, third man, right defence, and left defence; and six constituting the attack, viz. centre, right attack, left attack, first home, second home, and third home.

As a rule a game covers four periods of twenty minutes each. The game is started by the centre of either side 'facing' in the centre of the field, and playing off as in the 'bully' of hockey.

Goals can be scored only if the ball is propelled by the crosse into the goal-mouth. The ball is propelled by the foot or leg, but if it passes through the goal after such propulsion the score does not count. A player may check an opponent by placing his body so as to oppose his passage (*body-check*), but he may not deliberately charge or shoulder him, nor may he hold, strike, trip, or push him with his hand or crosse. Nor, save in the case of the goal-keeper alone, may he wilfully touch the ball with his hands.

Lacrosse is a swift, graceful game, strenuous though not excessively violent, and very attractive to spectators. For success, considerable skill and agility are called for, and speed is certainly a desideratum. Of recent date some of the best runners at Oxford and Cambridge have taken to the game as a form of training for their track events. But, as in most ball games, great speed alone will not get the better of technical skill, such as the capability of giving and taking short passes on the run.

In Canada the highest standard of play is demonstrated by professional teams. At the Olympic Games of 1908 (in London) an all-Canada amateur team was selected which was successful over the British team in a very close match. In addition to the inter-varsity contest, the most important lacrosse matches are played at Lord's cricket ground.

Lacrymatory (lak'-), a small glass vessel found in ancient sepulchres, in which it has been supposed the tears of a deceased person's friends were collected and preserved with the ashes and urn. Tears were supposed to contain 'soul substance', like saliva, hair, &c.

Lactantius, Lucius Cæcilius Firmianus, a celebrated Father of the Latin Church, probably

a native of Italy, and born about the middle of the third century. He lived for a long time at Nicomedia as a teacher of rhetoric, until Constantine the Great invited him to Gaul, and committed to his care the education of his eldest son Crispus. He died at Trèves about A.D. 325. His writings are characterized by a clear and agreeable style. His *Divinarum Institutionum Libri VII* is particularly celebrated.

Lactic Acid, or Hydroxy Propionic Acid ($C_3H_5O_3$). There are two hydroxy propionic acids: α -hydroxy propionic acid or ethylidene lactic acid, $CH_3CHOHCOOH$, and β -hydroxy propionic acid or ethylene lactic acid, CH_2OHCH_2COOH . The former is produced by fermentation of milk-sugar, and is present in sour milk; it is also found in meat juices. On a large scale it is manufactured from starchy materials, which are converted by means of malt into maltose, and then fermented by introducing the lactic acid bacillus. A dilute solution of lactic acid is obtained; this is concentrated and used in calico-printing and in tanning. Pure lactic acid is a colourless, strongly acid liquid which may be solidified, and then melts at $18^\circ C$. On examining lactic acid it is found that fermentation lactic acid does not affect plane polarization light, that is, it is optically inactive, whereas lactic acid from meat juice is optically active, and rotates the plane of polarization to the right. This active acid is given the name *sarc-lactic acid* or dextrolactic acid. Ethylene lactic acid is also found in the juice of flesh, and is optically inactive. Several salts of fermentation lactic acid are industrially important, such as zinc lactate, iron lactate, and calcium lactate.

Lactine, or Lactose, milk-sugar, ($C_{12}H_{22}O_{11}$), a sugar isomeric with cane-sugar, obtained by evaporating whey, filtering through animal charcoal, and crystallizing. It forms hard, white, semi-transparent crystals, which have a slightly sweet taste, and grate between the teeth. When it is boiled with dilute sulphuric acid, it yields glucose and galactose. See *Milk*.

Lactom'eter, an extensively used instrument for ascertaining immediately the specific gravity of milk. It is a modified form of hydrometer (q.v.), can be used only with milk, and consists of a graduated glass stem surmounting an expanded-air bulb, which carries underneath a smaller bulb weighted with mercury or small

shot to keep the instrument upright in the milk. These three divisions are entirely separate from one another. The graduated stem shows lactometer degrees, representing the second and third figures after the decimal in the specific gravity. $\frac{1}{4}''$ must be allowed for the meniscus on taking the reading, and the test must be made at $60^\circ F$., or between 50° and $70^\circ F$., a correction being made for temperature in the lactometer reading. The rule is to add .1 to lactometer reading, or .0001 to specific gravity for every degree above $60^\circ F$., and subtract for every degree below: e.g. lactometer reads 31; add .5 for meniscus; corrected reading, 31.5. Specific gravity, 1.0315 at $65^\circ F$.; corrected to $60^\circ F$., this would read 32 or 1.032.—BIBLIOGRAPHY: C. W. Walker Tisdale, *Milk Testing*; H. D. Richmond, *Dairy Chemistry*.

Lactuca'rium, or Lettuce Opium, the inspissated milky juice of several species of lettuce. It possesses slight anodyne properties, and is sometimes used as a substitute for opium. Lactucarium is a mixture of several compounds, the largest constituent being lactucerin.

Ladakh', a province of Kashmir, India, comprising part of the valley of the Upper Indus and its tributaries. Lying at the back of the central Himálaya, it has an elevation of from 9000 to 25,000 feet; area, about 45,762 sq. miles; capital, Leh. The climate is characterized by cold and excessive aridity. Of domestic animals, the principal are ponies, asses, oxen, sheep (regularly used as beasts of burden), goats, and dogs. The wool of the goat is the well-known shawl-wool of Kashmir. There is a considerable transit trade, Ladakh being naturally the great thoroughfare between Chinese Tartary and Tibet on the one hand, and the Punjab on the other. The trade is supervised by two Commissioners, one native and one British. Ladakh exports wool, borax, sulphur, and dried fruits. The language is Tibetan, the inhabitants are of the Mongol type, and the prevailing religions are Buddhism and Mahommedanism. Polyandry prevails. Pop. 186,000.

Lad'anum, a fragrant resinous gum which exudes from plants of the genus *Cistus*, such as the *Cistus creticus*. It is obtained chiefly in Crete, Cyprus, and certain parts of Asia Minor, and is highly prized in the East, where it is rolled into small balls to scent the hands.

Lado, a town of the Anglo-Egyptian Sudan, in the Bari country, on the left bank of the Upper Nile. It was founded by General Gordon in 1875 to take the place of Gondokoro (about 10 miles above Lado) as a military station. Lado was for some time the head-quarters of Emin Pasha.

Lad'oga, a lake of Russia, the largest fresh-water lake in Europe; length, 130 miles; mean breadth, 75 miles; average depth, 300 feet. It



Lactometer

receives the waters of Lakes Onega, Sarina, and Ilmen through the Volkhov, &c., and discharges it at its south-western extremity by the Neva. Ladoga is ice-bound for the greater part of each year, and even when clear, gales and violent storms make navigation dangerous for small craft. To remedy this, an elaborate canal system links up its shores with Petrograd and the Gulf of Finland. The Islands of Valamo and Konnevitza possess monasteries founded in A.D. 961 and 1393 respectively, and are much visited by pilgrims. The fishing on the lake is important.

Ladrões, or Marianne Islands, a group of seventeen islands in the North-West Pacific, all of volcanic origin and having some active craters in the northern group, which is uninhabited. The climate is good, except for occasional typhoons; the soil is fertile, maize, tobacco, and sugar being produced, and the islands, densely wooded, are very picturesque. The natives are mixed, Tagals, Caroline Islanders, &c., having replaced the original race. Discovered by Magellan in 1521, the Ladrões, excepting Guam, were sold by Spain to Germany on 1st Oct., 1899, for a sum of £840,000. Guam was handed over to America after the Spanish-American War of 1898, and is now a powerful United States naval station. Area, 225 sq. miles, and pop. (1920), 13,275. The remainder of the Ladrões were invested in 1914 by an Australian force and by Japan, who now governs them by mandate of the League of Nations, dated 17th Dec., 1920. Administrative centre, Sipan. Pop. 3638 (natives) and about 2000 Japanese.

Lady-bird, the name of a number of small beetles, common on trees and plants in gardens. The type-genus is *Coccinella*. Numerous species are native to Britain. They are of great service to cultivators on account of the number of aphides or plant-lice which they destroy.

Lady Day, the 25th of March, the day commemorating the Annunciation of the Virgin Mary; one of the regular quarter-days in England and Ireland. It is one of the immovable festivals of the Roman Catholic and Anglican Churches.

Lady-fern, a species of polypodiaceous fern, the *Athyrium Filix-femina*, common in Great Britain. It has bipinnate or tripinnate fronds of delicate texture, and of a remarkably graceful plummy structure.

Lady's-mantle (*Alchemilla vulgaris*), a British plant of the rose family, with rather large seven- to nine-lobed leaves (whence the name) and small greenish-yellow flowers.

Ladysmith, a town of Natal, on a slope near Klip River, and on the railway to Johannesburg. It is famous for the long siege which it withstood, under Sir George White, during the South

African War (30th Oct., 1899, to 28th Feb., 1900). Pop. 5500.

Lady's - slipper (*Cypripedium*), a beautiful genus of orchideous plants, with large inflated flowers, inhabiting north temperate regions. *C. Calceolus*, a very rare British plant, has a flower consisting of large, spreading, red-brown sepals and petals, and an obovoid pale-yellow lip.

Lady's - tresses, a common name for the British species of *Spiranthes*, a genus of Orchids. The spike of small, white, delicately scented flowers bears some resemblance to a plait of hair.

Laeken (lä'ken), a suburban district of Brussels. In the church of Notre-Dame is the crypt of the royal family of Belgium. The royal summer residence, burnt down and rebuilt in 1890, was enlarged in 1903. Pop. 30,438.

Laevulose, Fructose, or Fruit Sugar, ($C_6H_{12}O_6$), a sugar isomeric with glucose but differing from it in structure. Glucose belongs to the class of sugars known as the aldoses, whereas laevulose belongs to the ketoses; glucose is dextrorotatory and laevulose is levorotatory. It is found together with glucose in honey and in many fruits, and may be obtained from cane-sugar by boiling it with dilute hydrochloric acid, when cane-sugar is hydrolyzed, giving a mixture of glucose and laevulose, 'invert sugar'. Laevulose crystallizes from alcohol in colourless crystals which melt at 92°. It is very soluble in water, and is somewhat sweeter than glucose.

Lafayette (lä-fä-yet'), Marie Joseph Paul Yves Roch Gilbert du Motier, Marquis de, French general and statesman, born 1757, died 1834. At an early age he inherited the title and an enormous fortune, married Marie Françoise de Noailles when only sixteen, and eventually joined the Guards. He negotiated for a commission in the American army during the War of Independence, and accepted the appointment of major-general (being then nineteen years of age). Prohibited by Louis XV and warned by his friends, Lafayette set off for America and reached Philadelphia, where he was introduced to Washington. He fought with the Americans and subsequently returned to France, where he was called to the Assembly of Notables (1787), and became a member of the States-General. On the fall of the Bastille (14th July, 1789) he was appointed commander of the Parisian National Guard, and saved the king and queen from the mob at Versailles. He endeavoured to discredit the Jacobins, and commissioners were sent to arrest him, whereupon he left France, but was arrested in Austria and confined (at Olmütz) until 1797. During the consulate and subsequent reign of Bonaparte, Lafayette repeatedly refused office, but at the restoration in 1815 he took part politi-

cally in the Hundred Days. In 1824 he visited the United States, where he was received with enthusiasm, and was voted by Congress 200,000 dollars and a township of land. In July, 1830, during the Revolution, Lafayette was again made commander of the National Guard of Paris, and materially assisted in elevating Louis Philippe to the throne.—**BIBLIOGRAPHY:** A. Bardoux, *La Jeunesse de La Fayette*; C. Tower, *The Marquis de La Fayette in the American Revolution*; G. Morgan, *The True Lafayette*.

Lafayette, Marie Magdelaine de la Vergne, Comtesse de, French novelist, born 1632, died 1693. In 1655 she married Comte Francis de Lafayette, and her house became a place of meeting for the most distinguished men of her time, including La Rochefoucauld, Huet, Ménage, and Lafontaine. The most distinguished of her novels are *Zaïde*, *La Princesse de Clèves*, and *La Princesse de Montpensier*.

La Fayette, a town of the United States, in Indiana, on the Wabash River and Wabash and Erie Canal, and at the intersection of several railways. It is the seat of the State agricultural college, and has a number of miscellaneous manufactures. Pop. 22,540.

La Fère, a town of France, department of Aisne, at the confluence of the Serre and the Oise, 10 miles s. of St. Quentin. Captured by the Germans in 1914, it remained in their possession till 13th Oct., 1918, when it was retaken by the French.

Lafontaine (lä-fon-tān), Jean de, French poet and fabulist, born at Château-Thierry 8th July, 1621, died at Paris 13th April, 1695. He began to study for the priesthood, but forsook this career. His poetic talent was awakened by his reading of Malherbe, and in 1658 he dedicated a poem, *Adonis*, to Fouquet. In 1662 he was invited to Paris by the Duchesse de Bouillon. He was intimate with Molière, Boileau, Racine, and all the first wits of Paris, by whom he was much beloved for the candour and simplicity of his character. But he was no favourite with Louis XIV, who even hesitated to confirm his nomination to the French Academy. The first volume of his *Contes* (Tales) appeared in 1664, a second in 1671. They are full of fine touches of genius, but are grossly indecent. Of his *Fables* (in which animals are represented speaking and acting) innumerable editions have been printed, and it is through them that he is universally known.—**BIBLIOGRAPHY:** E. Fuguet, *Jean de La Fontaine*; Taine, *La Fontaine et ses Fables*.

Lagerlöf, Selma Ottilliana Louisa, Swedish writer, born in 1858. Her *Gösta Berlings Saga* (1891) brought her into the front rank of contemporary Swedish authors. She gained the Nobel Prize for literature in 1909, and in 1914 was the first woman to be elected a member of

the Swedish Academy. Among her works are: *Jerusalem*, a two-part novel (1901-2) and *The Outcast* (1920).

Lagging is the general name given to the process of preventing the loss of heat from hot surfaces. The term is also often used for the material employed. Perhaps the most scientifically perfect method is the use of a vacuum jacket, an example of which is to be found in the thermos flask invented by Professor Dewar. This flask is a double-walled vessel made of silvered glass, and the space between the outer and the inner glass shells is vacuum. The appliance possesses great powers of retaining heat, but its defects are that it is costly and fragile. The principle upon which the vacuum flask works is this—as there is no material round the outside of the inner vessel containing the hot liquid, this vessel can only lose its heat by radiation, and since the wall of the outer shell which surrounds it is highly polished, the radiation which falls on this polished wall is at once reflected back into the inner vessel from which it came, so that the amount of heat which penetrates the outer shell and escapes is very small.

In engineering work the properties desirable in a lagging material are that it should have a low heat conductivity, be non-inflammable, resist deformation under vibration, change of temperature, or the action of water and steam. A variety of materials having these properties to a greater or less extent are in use, such as slag wool, paper, asbestos, compressed cork, magnesia, and kieselguhr. A number of proprietary preparations of good insulating properties are available, of which Newall's magnesia covering may be taken as a good example. This covering consists of about 85 per cent of light magnesium carbonate and 15 per cent asbestos fibre. A steam-pipe carrying steam at 400° F. was tested unlagged and with different thicknesses of Newall's covering. When unlagged the heat loss was 1070 B.Th.U.'s per square foot per hour. With a thickness of 1 inch of lagging the loss became about 150 B.Th.U.'s per square foot per hour, and with 2 inches about 100, so that a thickness of about 2 inches reduces the heat loss to one-tenth of its full value when the pipe is unlagged.—**BIBLIOGRAPHY:** C. R. Darling, *Heat for Engineers*, and article in *Engineering*, 22nd Sept., 1911.

Lagos, a seaport town in the south of Portugal, province of Algarve. Admiral Boscawen defeated a French fleet at Lagos in 1759, and the coast in the vicinity was the scene of a desperate battle between Admiral Jervis (Earl St. Vincent) and a large Spanish fleet in 1797, the latter being destroyed. Pop. 8200.

Lagos, a seaport, island, and district of Southern Nigeria. After annexation by Great Britain in

1851 Lagos was augmented by the purchase or annexation of further land, and in 1874 was made a colony and protectorate. In 1906 it was united to Southern Nigeria, and is now the temporary seat of the Central Government of Nigeria pending the completion of the capital on the River Kaduna. The town is the principal port of Nigeria, and with the building of moles and a deep channel over the bar ocean-going steamers will find at Lagos an average and readily accessible anchorage. There are engineering- and repair-shops and slipways, and a wireless station was established in 1913. A railway running from Lagos has an extension to Kano (q.v.), over which a boat-train having *wagon-lit* and restaurant cars is run each week. The Governor of the district is President of the Legislative Council. There is a mission grammar school and a Government higher-grade school in the town. The town is electrically lit, has a race-course, water-supply, Government house, and an extensive cottage hospital. Pop. (town), 57,000.—The district has a pop. of over 2,250,000, including about 1000 Europeans.

Lagrange (lä-gränzh), Joseph Louis, French mathematician, was born at Turin 25th Jan., 1736, died at Paris 10th April, 1813, and was buried in the Panthéon. He had a natural bent for mathematics, and when scarcely nineteen years of age was appointed mathematical professor in the artillery school at Turin. In 1764 he obtained the prize of the Academy of Sciences in Paris for a thesis on the libration of the moon, and in 1776 for another on the theory of the satellites of Jupiter. About this time he made a visit to Paris, where he made the acquaintance of D'Alembert, Clairaut, Condorcet, and other savants. Soon after his return he received an invitation from Frederick the Great, to whom he had been recommended by D'Alembert, to go to Berlin as Director of the Academy, a post he held for twenty years. After Frederick's death (1786) the persuasion of Mirabeau and the offer of a pension induced him to settle in Paris. He was the first professor of geometry in the Polytechnic school, and was the first inscribed member of the Institute. In 1794 he was appointed professor in the newly established Normal School (École Normale Supérieure) at Paris (1794), as well as in the École Polytechnique. Napoleon bestowed upon him distinguished tokens of his favour, and as member of the Senate, grand officer of the Legion of Honour, and count of the empire, Lagrange saw himself surrounded with every external honour. But he remained as modest and retiring as ever, devoting himself with the same zeal and industry to his studies. The most important of his works are his *Mécanique analytique* (1788); *Théorie des fonctions analytiques* (1797); *Résolu-*

tion des Équations numériques (1798); *Léçons sur le calcul des fonctions*; and *Essai d'Arithmétique politique*.

La Harpe (lä ärp), Jean François de, a French dramatic poet, critic, and philosopher, born at Paris 1739, died 1803. His work *Lycee ou Cours de Littérature ancienne et moderne* constitutes his most durable title to fame.

La Hague (og), a bay of Northern France, on the east side of the peninsula on which Cherbourg stands, department of La Manche. A naval battle was fought here, 10th May, 1692, between the French under Tourville and the allied British and Dutch under Admiral Russell, in which the latter were victorious. The French fleet (44 ships) under Tourville were ordered by Louis XIV to invade England in support of James II, and met the allied fleets at Cape Barflur.

Lahore', a city of Hindustan, capital of the Punjab, on the Ravi. The city proper covers an area of 640 acres, and is surrounded by a brick wall 16 feet high, flanked by bastions. Among the prominent buildings are the fort, the palace of Jehanghir, the Pearl Mosque, the Great Mosque, the mausoleum of Ranjit Singh, Montgomery Hall, the Punjab University, Oriental College, and Mayo Hospital. The European quarter and the Meera Meer cantonment (at a distance of about 3 miles) lie outside the walls on the south and south-west. Lavan, son of Rama, is supposed to be the traditional founder of Lahore, but the city was probably founded in the first century A.D. In 1524 Lahore became the seat of the Mogul Empire, and it reached its greatest splendour during the reign of Akbar (1556-1605). Before passing into the hands of the British it was the capital of the Sikhs. Pop. 228,687.—Lahore division has an area of 12,387 sq. miles, and a pop. of 4,656,629.

Laiabach (li'bah), now Ljubljana, a town of Yugo-Slavia, formerly in Austria, and capital of Carniola. It is situated 35 miles north-east of Trieste, on the river of the same name. Its principal buildings are the cathedral of St. Nicholas, with fine pictures, frescoes, and carvings; the old Gothic town house; the old castle; the lyceum and other educational institutions. It manufactures woollen and cotton goods, and paper. Pop. 47,100.

Laing, David, Scottish antiquary, born in Edinburgh 20th April, 1793, died there 18th Oct., 1878. He became secretary of the Bannatyne Club, a position which he retained during the thirty-eight years of the society's existence. In 1837 he was appointed librarian to the Society of Writers to the Signet, an office which he held till his death. He was in turn treasurer, secretary, vice-president, and foreign secretary to the Scottish Society of Antiquaries. He published

the works of John Knox, with valuable notes; *Select Remains of the Early Popular Poetry of Scotland*; editions of Dunbar's, Henryson's, and Sir David Lyndsay's poems, and of Wyntoun's *Cronykil*.

Laing, Malcolm, Scottish historian, born 1762, died 1818. He was called to the Edinburgh Bar in 1785. His best-known work is the *History of Scotland from the Accession of James VI to the Reign of Queen Anne*, with a Dissertation proving the participation of Mary Queen of Scots in the murder of Darnley.

Laing's Nek, or **Lang's Nek**, a defile in Natal, immediately north of Majuba, where, in 1881, a small British force under Sir George Colley was cut up by the Boers.

Laissez-faire (lä-sä-fär). For centuries the European nations regarded their colonies as 'possessions' to be made to yield a profit. So the colonial produce must go to the home market only, and the colonial needs must be supplied from the home market. It was against this theory that Britain's American colonies rebelled in 1776. "We are not allowed", they complained, "to make even a horseshoe". A similar endeavour to secure economic advantage by State regulation governed commercial policy from the break-up of the mediæval system until the end of the eighteenth century. Cromwell's Navigation Acts did undoubtedly build up the British mercantile marine at the expense of the Dutch (and of incessant war), while his great French contemporary, Colbert, was extremely active in the promotion of State measures *pour faire aller le commerce* ('to make trade go'). Their efficacy was doubtful, and it was to M. Colbert that a French merchant, M. le Gendre, said *laissez nous faire*, 'let us alone'.

Against these interventions of the State in the regulation of commerce and manufacture, and against State-erected and State-favoured monopolies and privileges, the doctrine of *laissez-faire*, *laissez-passer* was invoked by the physiocrats in France and by Adam Smith in this country, and its application was generalized into the theory that the best government is that which governs least. At a later stage the theory was applied by Bentham and the utilitarians in defence of the rights of private property and the independence of private enterprise. The theory was supported by the Manchester school, whose great leaders, Richard Cobden and John Bright, viewed factory legislation with doubt and trade unionism with hostility. It is now recognized that *laissez-faire* implies the domination of the strongest; "between men who are unequal in material wealth", as Arnold Toynbee said, "there can be no freedom of contract". The whole tendency of modern times is away from *laissez-faire*: factory and public health

legislation, Education Acts, food inspection, municipal trading, Truck and Workmen's Compensation Acts, Trade Boards Acts, and a host of others bear witness to the modern repudiation of 'enlightened self-interest' as a sufficient directive of social and economic activities. See *Individualism*; *Labour Legislation*.

Lake, Gerard, Viscount, British general, born 1744, died 1808. He entered the army in 1758, and served in the Seven Years' War, in America in 1781, and in Holland from 1793 to 1794. He attained the rank of general, and was commander-in-chief in Ireland during the troubles of 1797-8, and in India during the Marathi (Maharatta) War (1803), which he brought to a brilliant conclusion. He defeated Holkar in 1805, returned to England in 1807, was made viscount, and appointed Governor of Plymouth, where he died.

Lake, a sheet or body of water occupying a basin formed by a depression of the lithosphere (earth crust) and not directly supplied with water by sea or ocean. Lakes may be of several varieties, and these variations may be classified in one of several different ways, either geologically or according to the nature of the drainage system of which they form a part. For convenience all lakes may be divided into five different classes: *crater lakes*, *tectonic lakes*, *barrier lakes*, *glacial lakes*, and *dissolution lakes*. Not infrequently they can be classified under several headings, e.g. the Great Lakes are partly water-eroded, partly tectonic, and partly glacial, such complications tending towards increased difficulty in simplifying classification. The majority of the mighty rivers, such as the Amazon and the Mississippi, find their source in small tarns fed by springs and by rains, such as Lake Itasca, which is the source of the latter river.

Lake District, a district in the north-west of England, famed for its picturesque and varied scenery, embracing parts of Cumberland, Westmorland, and the north-west portion of Lancashire, and extending about 30 miles north and south, and about 25 miles east and west. The district attracts large crowds of visitors, and the whole of it can be traversed in a week. The principal features of the scenery are lakes, mountains, and streams. The lakes comprise Buttermere, Ullswater, Derwentwater, Thirlmere, Grasmere, and Windermere, besides others. The highest peaks are Scafell Pike (3210 feet), Scafell (3161 feet), Helvellyn (3118 feet), and Skiddaw (3000 feet). There are some waterfalls or 'forces' (same word as Norwegian *foss*), of great beauty.—**BIBLIOGRAPHY**: W. Wordsworth, *A Guide through the District of the Lakes*; H. D. Rawnsley, *Round the Lake District*.

Lake-dwellings, the name given to habitations built on small artificial or partly artificial islands in lakes, or on platforms supported by

piles near the shores of lakes. The use of habitations of this nature is a subject which has engaged the attention of archaeologists and others very largely since the discovery of the remains of a lake-dwelling in Ireland in 1830, of similar ones in Switzerland in 1854, and subsequently of numbers of others elsewhere. The archaeological interest thus attaching to these lacustrine remains has drawn attention to the fact of similar dwellings being still used in various parts of the world, in Russia, the Malay Archipelago (Borneo and New Guinea), the Caroline Islands, Lake Maracaybo in Venezuela, New Zealand, and in a modified form in some parts of Central Africa. They afford a striking illustration of the spread of culture in early times, for



Lake-dwelling

the Swiss lake-dwellings were made many centuries ago, probably during the Neolithic phase of culture. The first who is known to have described lake-dwellings is Herodotus, who mentions certain dwellings of this kind on Lake Prasias in Thrace as being approached by a narrow bridge, each habitation having a trap-door in the floor, giving access to the water beneath, through which fish were caught. A great number of these *psahlbauten* (pile structures) have been discovered in the Swiss lakes, some belonging to the Iron Age, some few even to Roman times; but the greatest number appear to be divided in about equal proportions between the Stone and Bronze Ages. The Celtic lake-dwellings, called *crannoges*, are more or less artificial islands composed of earth and stones strengthened by piles, those of Ireland being of a much later date than those of Switzerland, and are frequently noticed in early history as strongholds of petty chiefs. Similar structures are not infrequent in Scotland. The relics found in these buildings have thrown much light on

prehistoric man, large populations having occupied these pile-dwellings during extended periods of time. Dr. Keller of Zürich first described the lake-dwellings of the European continent, and his account was translated into English.—BIBLIOGRAPHY: F. Keller, *The Lake Dwellings of Switzerland and other parts of Europe*; Robert Munro, *The Lake Dwellings of Europe*, and *Ancient Scottish Lake Dwellings*.

Lake of the Woods, a lake partly within South-Eastern Ontario, Canada, and partly in Minnesota, United States. It is upwards of 70 miles in length, has an extremely irregular form, and a coast-line of about 250 miles. It is studded with numerous wooded islands. Rainy River, the principal feeder of the lake, flows out of Rainy Lake, Minnesota, and enters the Lake of the Woods at its south-eastern extremity. It discharges from the north side by Winnipeg River, flowing to Lake Winnipeg. Kenora, at the northern outlet of the Lake of the Woods, became a growing town through new gold-fields in this region and through the water-power of a thousand lakes pouring into Winnipeg River. It has also flourmills and sawmills, and is a favourite summer-resort.

Lakhimpur (lak-him-pōr'), a British district of India, occupying the extreme eastern portion of Assam; area, 4529 sq. miles. It contains valuable forests, flourishing tea plantations, coal-mines, oilwells, &c. Pop. 400,000.

Lakshmi (from *lakṣa*, sign, token, fortune), in Hindu mythology, the wife of Vishnu. She is said to have sprung, Aphrodite-like, in full perfection from the froth of the ocean. According to other accounts, Lakshmi is supposed to have sprung from a lotus, and is therefore often called Padma, or goddess of the lotus, a flower she is always represented as holding. She is the Hindu Venus, the Ceres or goddess of abundance and prosperity. Flowers and grain are the offerings she most commonly receives.

Lalande (là-lând), Joseph Jérôme le François de, French astronomer, born at Bourg-en-Bresse, department of Ain, 11th July, 1732, died in Paris 4th April, 1807. He devoted himself to mathematics and astronomy, and was sent by the Academy in 1751 to Berlin to determine the parallax of the moon, while Lacaille went with the same object to the Cape of Good Hope. He was elected to the Academy of Sciences, Paris, in 1753, and in 1762 he became professor of astronomy in the Collège de France, where he lectured until his death. His chief works are his *Treatise on Astronomy*; *History, Theory, and Practice of Navigation*; and *Astronomical Bibliography*. Lalande is said

to have inspired Maréchal's *Dictionnaire des Athées*.

Lally-Tollendal, Thomas Arthur, Comte de, a French general, born in Dauphiné 1702, of Irish parents, his father having followed the fortunes of James II, and was beheaded 6th May, 1760. Trained to arms, he was made brigadier on the field of Fontenoy. He accompanied the Pretender to Scotland in 1745, and in 1756 he was made Governor of Pondicherry, war having been declared at that time between France and England. Defeated by Sir Eyre Coote at Wandiwash, he surrendered Pondicherry in 1761, and was brought prisoner to England. Within a month he was released on parole, and returned to France, where he suffered imprisonment for upwards of two years before he was brought to trial, condemned, and executed (1766) for treachery. His son, supported by Voltaire, obtained in 1778 a complete authoritative vindication of his father's conduct.—Cf. G. B. Malleson, *The Career of Count Lally*.

La'malism, a system of Buddhism maintained by the lamas and common throughout Tibet and Mongolia. It dates from the seventh century, and the name is derived from the Tibetan word *blama*, Superior One. All Buddhist priests are called lamas, and their gigantic and ubiquitous monasteries and nunneries are styled 'lama-series'. The highest object of worship is Buddha, the founder of the religion and the principal saint; the remaining saints are those common to Buddhism reinforced by a miscellany of canonized religious teachers and pious men. The Lamaist hierarchy resembles somewhat that of the Roman Catholic Church; auricular confession and litanies are points in common. The Dalai-Lama or Grand-Lama is the joint god and king of Tibet, and lives in splendid isolation in the colossal Potala overlooking Lhasa. Almost equally exalted is the Teshu or Bogodo Lama of Mongolia, in whom Gautama Buddha is also supposed to be incarnate. Below these gods are certain incarnations of saints, and then follow in order of precedence founders of lama-series, Buddhist monasteries, and those of the lower ranks who are distinguished by talents or learning. When either of the two lamas decides to allow his soul to migrate, his place may be filled according to directions given by himself before his (death) change, stating into what family he purposed transmigrating. Lamas never actually 'die'; they are reincarnated; they undergo a voluntary process of transmigration, but they dread the form in which they may be represented, and, as a consequence, no living thing is ever voluntarily killed. Should the deceased Grand-Lama fail to appoint a successor, the surviving Grand-Lama chooses, from among the boys born at the hour of his brother's departure, a num-

ber of infants into whom the god's soul may have migrated. From these selected infants the future Grand-Lama is chosen by lot, and is carefully tutored in the art of being a god until his majority at the age of eighteen years, when he becomes supreme in all things spiritual or temporal affecting his domains.—Cf. L. A. Waddell, *The Buddhism of Tibet or Lamaism*.

Lamarck, Jean Baptiste Pierre Antoine de Monet, Chevalier de, French naturalist, born in Picardy 1st Aug., 1744, died at Paris 18th Dec., 1829. He was the founder of invertebrate palæontology, as Cuvier was the founder of vertebrate palæontology. His first work was *Flore Française*, in which he advanced a new system of botanical classification, which was soon, however, abandoned for the natural system of Jussieu. Other chief works are *Philosophie zoologique*, in which he promulgated a theory foreshadowing what is now known as the law of evolution; *Histoire naturelle des animaux sans vertèbres*; and *Tableau encyclopédique de la botanique*.—Cf. A. S. Packard, *Lamarck: the Founder of Evolution*.

Lamarckism, the evolutionary theory propounded by the French naturalist Lamarck (1744-1829), who was one of the first to deny the immutability of species, to establish the facts of variation, and to emphasize the importance of the environment (*la monde ambiant*). He formulated the two following 'laws of nature', which express his views in summary form: (1) "In every animal that has not passed beyond the term of its development, the frequent and sustained use of any organ strengthens it, develops it, increases its size, and gives it strength proportionate to the length of time of its employment. On the other hand, the continued lack of use of the same organ sensibly weakens it; it deteriorates, and its faculties diminish progressively, until at last it disappears." (2) "Nature preserves everything that she has caused the individual to acquire or to lose by the influence of the circumstances to which the race has been for a long time exposed, and consequently by the influence of the predominant use of certain organs (or in consequence of their continued disuse). She does this by the generation of new individuals, which are produced with the newly acquired organs. This occurs, provided that the acquired changes were common to the two sexes, or to the individuals that produced the new forms." Lamarck believed, for example, that the long neck of the giraffe was gradually evolved by the action of these laws. He supposed that by constant efforts to reach the foliage of trees the necks of individuals became somewhat longer, each successive gain in length being transmitted to the next generation. There can be no doubt that individual

organisms adapt themselves in various ways to their surroundings, such adaptations being technically known as 'acquired characters' or accommodations. But the researches of Galton, Weismann, and many others have resulted in the generally accepted conclusion that such acquired characters are *not* inherited. According to these authorities, only such variations as take place in the germ-cells can be transmitted to offspring. Although Darwin rejected the conclusions of Lamarck, he attached a certain amount of evolutionary importance to the effects of use and disuse, but most modern authorities repudiate Lamarckism altogether. The matter is by no means finally settled, for it is conceivable that some acquired characters may react upon the germ-cells, stimulating them to variation in the same direction. A Lamarckian school still exists, and also a modification known as Neo-Lamarckism, which asserts that a changed environment, acting on a succession of generations, may gradually bring about structural modification of adaptive character, and this necessarily involves transmission from parent to offspring. Definite proof or disproof, one way or the other, is extremely difficult. Many persons are reluctant to give up Lamarckism because they like to believe that intellectual advances made by parents can be transmitted to their children. It is, however, more than doubtful that the hereditary make-up of a new-born baby has been advantageously modified by the mental advances achieved by his parents.—BIBLIOGRAPHY: F. W. Hutton, *Darwinism and Lamarckism, Old and New*; S. Butler, *Evolution, Old and New*.

Lamartine (lá-már-tén), Alphonse Marie Louis de Prat de, French poet and statesman, born at Macon, in Burgundy, 1790, died in Paris, 1869. By his first production, *Méditations poétiques* (1820), he at once obtained a high place among the poets of the day. In 1820 he was attached to the legation at Naples, and married a rich English lady, Eliza Marianna Bach. The *Nouvelles méditations poétiques* (1823) and the *Harmonies poétiques et religieuses* (1828) established his poetic fame, and obtained for him a nomination into the French Academy (1830). After the Revolution of July he travelled in the East, and on his return published *Voyage en Orient, souvenirs, impressions, pensées et paysages* (Paris, 4 vols., 1835). During his absence he had been elected a member of the Chamber of Deputies, and thenceforward his career was as much political as literary. In 1847 he published his *Histoire des Girondins* (Paris, 8 vols.), in which he manifested strong Republican leanings. After the February Revolution of 1848 he became a member of the Provisional Government in the capacity of Minister of Foreign

Affairs. After the Insurrection of June, 1848, he lost his popularity, and in 1851 withdrew from public life. His *Mémoires* appeared in 1871. His works appeared in 40 vols. during 1800–6.—BIBLIOGRAPHY: Ch. de Pomairols, *Lamartine*; E. Deschanel, *Lamartine*; Rod, *Lamartine*; F. Brunetière, *Évolution de la Poésie lyrique*; E. Sugie, *Lamartine*.

Lamb, Charles, English essayist and humorist, was born on the 10th Feb., 1775, and died on the 20th Dec., 1834. His father was clerk to Samuel Salt, a bencher of the Inner Temple, who obtained for Lamb a nomination to Christ's Hospital. Lamb remained there for seven years (1782–9), and while there formed a friendship with Coleridge which had an abiding influence on his life and work. Charles Lamb was employed for a short time in the South Sea House, but in 1792 he became a clerk in the accountant's office of the India House, remaining there for thirty-three years. In 1796 occurred the terrible family tragedy which was destined to mould the whole of Lamb's life. There was a certain amount of mental instability in the Lamb family, inherited from their mother. Mary Lamb, who was ten years older than her brother Charles, in a fit of acute mania stabbed her mother to the heart. Lamb at once assumed full responsibility for the custody of his sister, instead of allowing her to be sent for life to a public asylum, and devoted the whole of his life to caring for her. At intervals her mental disease became acute, and she had to be confined, but as a rule the brother and sister lived together, changing their lodging frequently when the nature of Mary's malady became known.

Lamb's earliest poems were published in a volume of poems by Coleridge in 1796. In 1798 Lamb and a friend named Lloyd published a joint venture under the title of *Blank Verse*. This volume contains the well-known *Old Familiar Faces*. In the same year he published his prose romance *The Tale of Rosamund Gray*. Lamb became a devoted student of the Elizabethan dramatists, and their influence is plainly to be seen in his *John Woodvil*, which was published in 1802. As a drama this play has nothing to recommend it, but it has many pleasing passages reminiscent of Fletcher and Massinger. In 1806 Lamb again experimented with the drama, writing this time a farce called *Mr. II.*, which was produced at Drury Lane. It was a complete failure. It is a very slight piece which turns upon the hero trying to keep his unpleasant name of Hogshead from becoming known. In 1807 Charles and Mary Lamb combined to write their *Tales from Shakespeare* for William Godwin's Juvenile Library. Mary was responsible for the comedies and Charles for the tragedies. This book was very successful, and its reception

encouraged them to write two other books for children, *Mrs. Leicester's School* (1807) and *Poetry for Children* (1809). Lamb also wrote *The Adventures of Ulysses*, based upon Chapman's translation of Homer.

It was not until 1820, however, that Lamb began to write the series of essays which made his reputation as an essayist and humorist. His reputation as a critic had already been made in 1808 by his *Specimens of Dramatic Poets*, a selection of choice passages from his favourite Elizabethans, illuminated by brief notes which display a rare insight, and which are couched in felicitous language. *The Essays of Elia* were originally contributed to *The London Magazine*, the first, in which Lamb embodied some of his recollections of the South Sea House, appearing in Aug., 1820. Lamb took the name of 'Elia' from a foreigner of that name who had been a clerk with him in the South Sea House. A collected edition of the essays was published in 1823; the series ceased to appear in *The London Magazine* in 1825, and *The Last Essays of Elia* were collected in a second volume in 1833.

Early in 1825 Lamb retired from the India House with a pension of £450 a year. His sister's health and, indeed, his own became gradually worse. He was deeply affected by the death of Coleridge in the summer of 1834, and in the following December he fell and cut his face; erysipelas supervened, and he died after a short illness. Mary Lamb survived until May, 1847.

Lamb is one of the best-loved of English men of letters. His quaint humour, his tenderness, his devotion to his sister, and his loyalty to his friends set him in a place apart. His style is very closely modelled on that of the Elizabethans, especially Burton; but he wrote naturally in this way, which would seem an affectation in other writers. As a critic Lamb was a pioneer, and still remains unrivalled for his succinct criticisms of the Elizabethans. But he is chiefly loved for himself, something in the way in which Horace is loved. He has revealed most completely and most modestly his own charming personality, and his essays are read more on account of that revelation than because of their style, their wisdom, or even their lambent humour.—BIBLIOGRAPHY: A. Ainger, *Charles Lamb* (English Men of Letters Series); E. V. Lucas, *The Life of Charles Lamb*; P. Fitzgerald, *Charles Lamb: his Friends, his Haunts, and his Books*; W. C. Hazlitt, *Mary and Charles Lamb*.

Lambayeque (lām-bā-yā'kā), a coastal department of Northern Peru; area, 4614 sq. miles. There has been no census since 1876, although an Act of the Peruvian Congress of 30th Oct., 1920, has authorized the Executive to proceed with an enumeration. The chief town is Chiclayo, connected by rail with Eten and Piata on the coast.

The district is important as the sugar-producing area of Peru, and Chiclayo lies in the cotton belt.

Lambert, Daniel, noted for his extraordinary size, was born in Leicester 1770, died at Stamford 21st July, 1809. He was exhibited in London and the principal towns of England, and at the time of his death was 5 feet 11 inches in height, weighed 739 lb. (over 52½ stone), and measured 9 feet 4 inches round the body, and 3 feet 1 inch round the leg.

Lambert, John, Parliamentary general during the English Civil War, born at Kirkby Malhamdale, Yorkshire, 1619, died in 1694. He entered the Parliamentary army under Fairfax, was colonel at Marston Moor, and major-general in the war in Scotland. He took the lead in the council of officers who gave the protectorate to Cromwell, but he afterwards fell into disgrace, and was deprived by Cromwell of all his commissions, though a pension of £2000 was allowed him for past services. He headed the confederacy which deposed Richard Cromwell, and in 1660 set out for the north to encounter Monk, but was deserted by his troops, seized, and committed to the Tower. At the Restoration he was excepted from the act of indemnity, brought to trial, and condemned to death, but had his sentence commuted to banishment to Guernsey. In 1666 a plot for his escape was discovered, and in 1667 he was removed to the Island of St. Nicholas, in Plymouth Sound, where he died.

Lambert's Pine (*Pinus Lambertiana*), a North American pine growing in California, and sometimes reaching the height of 300 feet. It yields, when burned, a sugary substance known as Californian manna. The leaves are in fives, the cones are 14 to 18 inches long, and contain edible seeds.

Lambèse, a town of Algeria, department of Constantine. It is the site of the ancient Lambæsa, which would appear to have been established in the time of Hadrian as the headquarters of the third Legion (Augustan), but fell into decay before the advent of Christianity, and no Christian inscriptions are to be found among the ruins.

Lambeth, one of the twenty-eight boroughs of the county of London, famous for its potteries and the site of many historical and notorious buildings. Lambeth Palace has been, since the thirteenth century, the official residence of the Archbishops of Canterbury, and contains a library of some 30,000 volumes and valuable MSS. Each year the palace becomes a gigantic conference hall, where all the Anglican bishops assemble from throughout the world to discuss the policy and management of the Church. Among other famous buildings in Lambeth are: the Union Jack Club, Waterloo Station, St.

Thomas's Hospital, and Brixton Prison. Pop. (1921), 302,960.

Lambeth Articles, a series of nine articles drawn up by William Whitaker and others in 1595, embracing the most pronounced doctrines of Calvinism. The articles, concerning the doctrines of predestination, justification, and free-will, were approved by Archbishop Whitgift, but were rejected by the queen and the Parliament, and again at the Hampton Conference, 1604.

Lamellibranchiata (-brang-ki-á'ta), or **Pelecypoda**, a class of Mollusca, represented by the oysters, mussels, cockles, &c., which are distinguished by the possession of a bivalve shell composed of right and left valves; and there is no rasping organ, and most species possess a laterally flattened muscular foot, by which burrowing in sand, mud, &c., is effected. There is, however, no foot in fixed forms, such as oysters.

Lamellicornes (-néz), an extensive series of beetles, including the Cockchafer, May-bug, Rose-chaffer, Dung Beetle, &c.; named from the lamellated club in which the antennæ terminate.

Lamellirostres, a group instituted by Cuvier to include the ducks, mergansers, &c., birds distinguished by the flat form of the bill, which is invested by a soft skin, and provided at the edges with a set of transverse plates or lamellæ, through which the mud, in which these birds grope for food, is sifted or strained.

Lamennais (lá-men-á), Hugues Félicité Lamennais, French philosopher and publicist, who wrote on religion and politics, born at St. Malo, Brittany, on 16th June, 1782, died in Paris 27th Feb., 1854. He was ordained priest in 1816, and first attracted attention by his apology for Roman Catholicism, the *Essai sur l'indifférence en matière de religion*. In 1824 he declined the offer of a cardinal's hat, and the following year published a work favouring ultramontane doctrines, *La Religion considérée dans ses rapports avec l'ordre civil et politique*. From this time he began to preach the separation of Church and State, and on the outbreak of the July Revolution (1830) he became a convert to the dogma of the sovereignty of the people. In September of that year he began to publish his *L'Avenir*, which was in 1832 condemned by the Pope and suppressed. In 1834 he finally revolted from Rome in his *Paroles d'un Croyant* (Words of a Believer). This book, which produced an almost unexampled sensation, passed in a few years through more than 100 editions, and was translated into almost all living languages. It was condemned by the Pope, and Lamennais answered by the *Affaires de Rome*. His subsequent works were all extremely democratic, and he gradually became both atheist and socialist. At the Revolution of 1848 he became a member of

the National Assembly, but after the *coup d'état* he lived in strict retirement.—**BIBLIOGRAPHY:** Sainte-Beuve, *Portraits Contemporains*; P. Janet, *La Philosophie de Lamennais*; W. Gibson, *The Abbé de Lamennais and the Liberal Catholic Movement in France*.

Lamentations, the name given in the authorized version of the Scriptures to a liturgical poem made up of five distinct elegies. They appear in the Hebrew canon with no name attached, but ancient tradition, internal evidence, and a prefatory verse which appears in the *Septuagint* point to the authorship of Jeremiah. The first four of the dirges are alphabetical acrostics, successive verses, or in chap. lii successive acts of three verses, beginning alphabetically. Chap. v is not in acrostic form. According to Josephus, Jerome, and also some modern critics, these poems were written on the death of King Josiah (cf. *2 Chron.* xxxv, 25), but the contents of the book itself plainly show that a national calamity—the destruction of Jerusalem and the overthrow of the Judean state by the Chaldeans—is referred to.

La Mettrie, Julian Offray de, French physi-cian and materialist, born at Saint Malo in 1700, died in 1751. He studied theology at Jansenist schools and medicine in Paris and Rheims, fought at Dettingen and Fontenoy, and was severely wounded. He taught that the soul perishes with the body, and that physical phenomena are the result of organic changes of the brain. Expelled from France for his materialistic views, he was well received by Frederick the Great, who appointed him court reader. His works include: *Histoire naturelle de l'âme*; *L'Homme machine*; *L'Homme plante*; and *Ouvrage de Pénélope ou le Machiavel en Médecine*.

Laminariaceæ, Kelps or Tangles, a family of Brown Alga, distinguished by their large size and complicated internal structure. They are mostly deep-water sea-weeds, and flourish best in the colder parts of the ocean. *Laminaria saccharina*, with simple, and *L. digitata*, with palmately divided fronds, are abundant on our coasts, and form the principal source of kelp (q.v.). See *Lessonia*; *Macrocystis*; *Nereocystis*.

Laminated is a term used to describe material which is apparently made up of thin plates or layers. Lamination is a defect often met with in steel and other metals where there is a separation of the material into layers. Sometimes metal parts are built up of a number of sheets or plates in layers; the finished article is said to be laminated, as in springs and armature cores.

Lamination, the arrangement of rock-material in thin layers or laminae. This arrangement prevails especially in shales.

Lammas, one of the four quarterly term days in Scotland, occurring on 1st Aug. The name

is from the Old-E. *hlaf-mæsse*, that is, *loaf-mass*, bread-feast; so called because on this day offerings were formerly made of the first fruits of harvest.

Lammergeier (lám'ér-gl-ér; Ger., 'lamb vulture'), the bearded vulture, a bird of prey of the genus *Gypætus* (*G. barbatus*), family Falconidae, and linking this to the vultures and the



Lammergeier (*Gypætus barbatus*)

eagles. It inhabits the Swiss and German Alps, as well as the higher mountains of Asia, and is the largest European bird of prey, measuring upwards of 4 feet from beak to tail, and 9 or 10 feet in the expanse of its wings. Besides eating carrion, it preys on living chamols, lambs, kids, hares, but it does not disdain, when pressed, rats, mice, and other small quadrupeds. In Africa it is replaced by an allied species (*G. ossifragus*).

Lammermuir Hills, a range of Scottish hills stretching in a generally eastward direction from south-east Midlothian to the North Sea, and forming part of the boundary between Berwick and Haddingtonshires. Highest summit, Lammer Law (1733 feet).

La Motte, Jeanne de Valois, Comtesse de, French adventuress, a descendant of the family of Valois by an illegitimate child of Henry II, and notorious for the part she played in the 'diamond necklace' fraud; born 1756, died 1791. She married the Comte de la Motte, a penniless adventurer, and settled in Paris about 1780. In the years 1783-4 the Prince-Cardinal de Rohan, who had fallen into disgrace, was persuaded by her that the Queen, Marie Antoinette, regarded him with much favour, which would be increased if he would assist her in purchasing a valuable diamond necklace which Louis XV had ordered for Madame du Barry, but which was still in the jeweller's hands. The cardinal fell into the snare; he agreed to stand surety for the payment, and the necklace was delivered to him. Joseph Balsamo, Comte de Cagliostro, and probably the queen also, was in the plot; the necklace dis-

appeared, was broken up and sold, probably by the La Mottes. The jeweller, after waiting a long time for his money, applied direct to the court, and the plot was discovered. Cagliostro, the cardinal, and others were thrown into the Bastille, but at the trial only the La Mottes were convicted. They escaped to England, where the comtesse wrote *Mémoires* implicating the queen in the fraud. She was killed by falling out of a window in a drunken orgy, and her husband lived a miserable wandering life till his death in 1831.

Lamp, a vessel in which oil or other inflammable substance is burned to produce artificial light. The term is, by association, applied to any device in which light and heat are produced, such as arc lamp and incandescent lamp. The earliest lamps in common use were made of baked clay, with a simple opening in the top through which the wick passed. In later days much was done to improve the appearance of these lamps, and eventually lamps made of metal—generally bronze—were introduced. Although considerable attention was devoted to the ornamentation of these early lamps, little or no consideration was given to the improvement in the efficiency of the lamps as light producers until the latter half of the eighteenth century. At this time the small cord wicks were replaced by flat wicks with raising and lowering gear. In 1784 Aimé Argand, of Geneva, introduced an improved lamp in which a circular wick was employed, with an air supply up the central tube as well as on the outside of the wick. A glass funnel surrounding the flame and supported on a perforated base below the burner improved the combustion. This Argand burner, with small modifications, is the basis of most modern oil-lamps. Oil-lamps in which the fuel is made to take a gaseous state by heating and the use of air pressure are used for both lighting and heating. In some of the lighting devices of this character illumination is obtained by the partial vaporization of the oil. Where the oil is completely changed in state, a flame of the Bunsen character is used to heat a mantle to incandescence. The heating lamps are usually of the type giving complete vaporization of the oil, such as the Primus. For lighthouse work, oil-lamps of the circular-wick type are usual, but in some cases gas- and electric-lamps are employed. See *Electric Light*; *Gas Manufacture*.

Lampblack, a fine soot formed by the condensation of the smoke of burning oil, pitch, or resinous substances in a chimney terminating in a cone of cloth. It is used in the manufacture of pigments, blacking, and printing inks. See *Carbon*.

Lampedusa, a small island of Italy, about midway between Sicily and Tunis, where there

is an Italian penal settlement. It produces wine and fruits, and has a small but excellent harbour.

Lampeter, a municipal borough and town of Wales, Cardiganshire. The town is well known as the seat of St. David's College, affiliated with Oxford and Cambridge, which trains candidates for the Episcopalian ministry. Pop. about 2000.

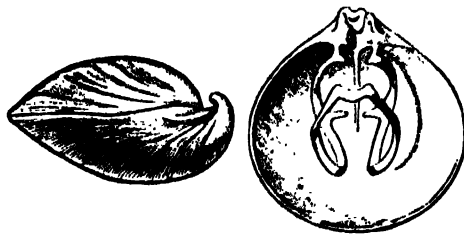
Lamprey, the name of several eel-like, scaleless vertebrates, ranking below fishes, which inhabit both fresh and salt water; genus *Petromyzon*, class *Cyclostomata*. The lampreys have seven rounded gill-apertures on each side of the neck, and a single nostril on the top of the head; they have no pectoral or ventral fins. There are no biting jaws, and the mouth is in the form of a sucker, lined with strong teeth and cutting plates, and the river lampreys are often seen clinging to stones by it. The egg hatches out into a peculiar larva known as *Ammocetes*. The marine or sea lamprey (*P. marinus*) is sometimes found so large as to weigh 4 or 5 lb. It is of a dusky brown marbled with yellowish patches, is common round the British coasts, and is also found on the east coast of North America and the west coast of Africa. It ascends rivers in the spring for the purpose of spawning, and was formerly much valued as an article of food. Other species, some belonging to distinct genera, are native to the coasts and fresh waters of North America, Chile, Australia, New Zealand, and Japan. The river lamprey or lampern (*P. fluviatilis*) is a smaller species, and abounds in the lakes and rivers of northern countries. It is coloured black on its upper, and of a silvery hue on its under surface. A close ally is the sand-lampern, sand-pride, or sand-piper (*P. pumilus*). Lampreys attach themselves to other fishes and rasp away their flesh; they also eat soft animal matter of any kind.

Lamprophyre, a name first given by Gumbel to Bavaria to certain igneous rocks rich in mica, which have in consequence a brilliant lustre (Gr. *lampros*). It is now used, following Rosenbusch, for a wide range of compact rocks, mostly occurring as dykes, and specially rich in mica, andalusite, or pyroxene. The feldspars range from orthoclase to lime-soda species, and the percentage of silica in the lamprophyre group may vary from 65 to 40.

Lamp-shells, the familiar designation of members of the phylum Brachiopoda, especially those of the genus *Terebratula*, the bivalve shells of which when closed bear a close resemblance to the shape of the old Roman or classical lamp. The valves are dorsal and ventral in position, and bilaterally symmetrical. They are of unequal size, the ventral one being larger and perforated by a round hole, through which protrudes a stalk by which the animal is attached to some firm object.

Lanark, the county town of Lanarkshire, is a royal, municipal, and police burgh, situated on an elevation near the right bank of the Clyde, 31 miles south-east of Glasgow by the Caledonian Railway. It is a very ancient place, and was made a royal burgh by Alexander I. Not far from Lanark are the Falls of the Clyde, in a romantic and richly wooded part of the valley, which render the town a favourite resort for tourists. Pop. (1921), 6268.

Lanarkshire, or **Clydesdale**, a south-western inland county of Scotland, lying in the valley of the River Clyde; area, 564,284 acres, of which about one-third is under cultivation. It is divided into three principal districts or wards, called respectively the Upper, the Middle, and the Lower, the last containing the greater part of Glasgow, which, however, is a county-city. The upper ward consists largely of mountain, moorland, and pastoral heights, several of the elevations reaching from 2000 to 3000 feet above the sea. The middle and lower wards comprise a large aggregate of arable land, woodland, and a rich tract of orchard country which has long been famous. They are also very rich in coal, iron-stone, limestone, and sandstone, which are extensively wrought, and the development of these industries has made Lanarkshire the most densely populated of all Scottish counties, containing roughly one-third of the total population of the country (i.e. pop. (1921), 1,539,807, or 31.5 per cent of total Scottish population). Historically the county is of great interest, and associated with such battles as Drumclog and Bothwell Brig. The River Clyde traverses the county from S.E. to N.W., and practically divides it into halves. The main contributory streams are the Kelvin, Cart, Douglas, Avon, and Calder. There are seven parliamentary divisions. The chief towns are Glasgow, Coatbridge, Airdrie, Hamilton, Ruther-



Lamp-shell

Side view and interior of dorsal valve, showing support for arms.

glen, Motherwell, Wishaw, and Lanark, the county town, which is smaller than any of the others. Lanarkshire is one of the main breeding-grounds of the famous Clydesdale type of heavy draught horse, which combines great muscular

strength and endurance with an amiability and docility that has recommended it, above the Shires and Suffolks, to foreign and colonial buyers.

Lancashire, or the County Palatine of Lancaster, a maritime county in the N.W. of England, facing the Irish Sea, a part of it in the north, called Furness, being cut off from the rest by Morecambe Bay; area, 1,194,555 acres. Towards the sea the land is flat, but on the east and north it becomes more elevated. The district of Furness is an integral part of the mountains of Cumberland, the highest summit being Conistone 'Old Man', 2683 feet. The peat-mosses or bogs of Lancashire form one of its most remarkable physical features. The most extensive of these is Chat Moss (q.v.). The most important mineral product of Lancashire is coal, which occurs abundantly in the south and south-west. Another valuable product is the hæmatite iron ore, which occurs abundantly in the Furness district, and the working of which inaugurated a new era in this part of the county. Excellent freestone is quarried near Lancaster. Limestone occurs abundantly. In the north of Furness are quarries of blue slate, and copper occurs and is worked in Conistone Fells. Lancashire is the grand seat of the cotton manufacture, not only of England, but also of the world, Manchester being the principal centre. Woollen goods are also largely produced, as is also machinery of all descriptions, and a vast variety of other articles. Liverpool is the great shipping port of the county and of England. Lancaster is the county town, but there are a great many others far larger, such as Liverpool, Manchester and Salford, Oldham, Bolton, Blackburn, and Preston. Blackpool and Southport, two of the best-known seaside-resorts in England, are situated upon the Lancashire seaboard. As one of the Counties Palatine, Lancashire is nominally attached to the Duchy of Lancaster, and the king, being Duke of Lancaster, has the right of appointing its sheriff. Pop. in 1911, 4,756,844; in 1921, 4,928,359.

Lancaster, Joseph, the propagator of the educational system (Lancasterian system of instruction) with whose name is coupled that of Dr. Andrew Bell, was born in London in 1778, died at New York through a carriage accident, 1838. In 1798 he opened a school for children in Southwark, which he conducted on the monitorial system, which had been previously outlined by Dr. Bell, 1797. (See *Bell, Andrew*.) The principal features of the system were the teaching of the younger pupils by the more advanced students, called monitors, and an elaborate system of mechanical drill, by means of which these young teachers taught large numbers at the same time. He soon found powerful support, and was able to erect a school-

house, which in 1805 was attended by 1000 children. The number of his patrons and the amount of subscriptions continuing to increase, he founded a normal school for training teachers in his system, which he now hoped to be able to extend over the whole kingdom. He made extensive tours through Great Britain and Ireland, and in 1811 had founded 95 schools, attended by 80,000 children. He was reckless and improvident in his habits; became bankrupt, and emigrated to America in 1818, where he at first received some support, but ultimately fell into poverty.—Cf. A. B. Binns, *A Century of Education, 1808–1908, being the Centenary of the British and Foreign School Society*.

Lancaster, a municipal borough and river-port, England, the county town of Lancashire, on the left bank of the Lune. It occupies the acclivities of a hill, on the summit of which stands the castle, now used as the county jail, built in the reign of Edward III, but with a keep supposed to be Saxon, and with a tower on the south-east attributed to the Emperor Hadrian. The town is connected by canal with Preston and Kendal, has excellent railway facilities, and many general manufactures. Pop. (1921), 40,226.

Lancaster, a city of the United States, capital of Fairfield county, Ohio, on the Hocking River, about 32 miles S.E. of Columbus. It is situated in a natural-gas district, and petroleum was tapped quite near the city in 1908, while there are iron-foundries, flour-mills, and manufactures of machines and agricultural implements. Pop. 14,706.

Lancaster, a city of the United States, in Pennsylvania, seat of Lancaster county, and formerly the state capital. It has very extensive manufacturing interests, and is one of the principal tobacco-leaf markets. It is also the centre of a rich wheat district, and carries on an extensive lumber trade. Pop. 53,150.

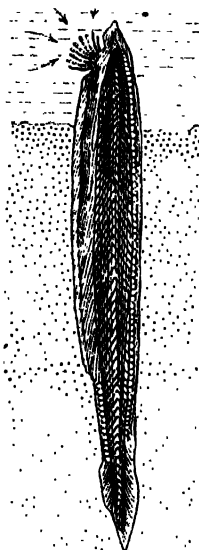
Lancaster, Duchy of, a duchy annexed to the English Crown in the reign of Henry IV, which had separate courts of its own till the passing of the Judicature Act of 1873. Its revenues go directly into the privy purse of the sovereign, who is Duke of Lancaster, and are not reckoned among the hereditary revenues surrendered for the Civil List. The payments made in 1920 were £48,000. The chancellorship is a political appointment, and the Chancellor is generally a member of the Cabinet. The duties are nominal.

Lancaster, House of, the name given in English history to designate the line of kings—Henry IV, V, and VI—immediately descended from John of Gaunt, fourth son of Edward III. Edmund, second son of Henry III, was created Earl of Lancaster and Leicester. His son Thomas added Derby and Lincoln to his titles, became

leader of the baronial opposition to Edward II, and was beheaded for treason. His grandson was advanced to the dignity of a duke, and dying without male issue, the inheritance fell to his daughter Blanche, who became the wife of John of Gaunt.

Lancaster Sound, a passage leading from the north-west of Baffin Bay west to Barrow Strait. It was discovered by Baffin in 1618, is about 250 miles long, and has a central breadth of about 65 miles.

Lancelet, the popular name of primitive marine vertebrates, 2 or 3 inches long, with a slender, compressed, transparent, lance-shaped body, occurring in shoal water in the temperate and torrid parts of the earth, where they burrow actively in the sand. They were formerly referred to as a single genus and species (*Amphioxus lanceolatus*), but a number of species are now recognized and placed in two genera (*Branchiostoma* and *Asymmetron*). These constitute the sub-phylum Cephalochorda of the vertebrate phylum. At one time they were regarded as a lowly group of fishes (Pharyngobranchii or Leptocardii). No true or paired fins are present, and in the other parts of their anatomy the low organization of these creatures is readily appreciable. The vertebral axis consists of a slender rod (*notochord*) pointed at each end, and composed of elastic tissue. There is no skull. The mouth is of oval shape, situated below and slightly behind the front part of the body, and there are no true jaws. Its margin is stiff, and bears a number of delicate ciliated filaments or *cirri*. The mouth leads backwards into a very large dilated chamber representing the expanded pharynx, which performs the part of a breathing organ; and the walls or sides of the pharynx are perforated by transverse clefts or fissures, whilst the inner lining of the chamber is ciliated. Breathing takes place by the admission of water through the mouth into the dilated pharynx, the effete water passing through the slits or clefts in the sides of the sac into an aerial cavity, whence it escapes outwardly by an opening known as the 'abdominal pore'. The circulation of the blood,



Lancelet Feeding

which is destitute of colour, is performed by pulsation of the main blood-vessels, there being no distinct heart. The pharynx is continued into a stomach and straight intestine. The lateral muscle is divided into a series of segments, and the central nervous system consists of a tube lying above the notochord. A patch of pigment embedded in the front of this tube represents a simple eye. The sex-organs are in the form of a series of thickenings in the body-wall, which discharge their products into the surrounding sea-water, where fertilization takes place. The egg hatches out into a larva, which passes through a complicated metamorphosis to reach the adult stage.

Lancelot of the Lake, the name of one of the puladins celebrated in the traditions and fables relating to King Arthur and the Round Table. According to tradition, Lancelot was the son of Ban, King of Brucie, was educated by the fairy Viviana (the Lady of the Lake), and became one of the chief knights of Arthur's court. His love for Genevra, or Guinevere, the beautiful wife of Arthur, and his disregard of Morgana, a fairy, and the sister of Arthur, placed the knight in the most dangerous and marvellous situations, from which, however, he always extricated himself by his valour and the assistance of the Lady of the Lake. *Le Roman or Lancelot du Lac*, a famous mediæval romance, was compiled by Walter Mapes (1150-96). The oldest extant form of the Lancelot story is contained in the German poem *Lanzelet* by Ulrich von Zatzikhoven (twelfth century). The tale, however, is probably Celtic in its essentials. Christien de Troyes, the French trouvère, made use of the Lancelot story for a love romance. The story passed from the French into the *Morte Darthur* of Sir Thomas Malory, printed in 1485. Lancelot is one of the chief figures in Tennyson's *Idylls*.—(Cf. J. L. Weston, *The Legend of Sir Launcelot du Lac*.)

Lancers, light cavalry taking their name from their principal weapon, a 9-foot lance. There are in the British service six regiments of lancers, and the name is also well represented among the cavalry regiments of the Indian army.

As a weapon for cavalry the lance has not been continuously used in the British or any other European army. In the Middle Ages it was the principal arm of the knights, each of whom, whatever other weapons he might carry, had a lance carried for him by his squire. Then, with the gradual introduction of fire-arms, it became the fashion to place too much reliance on the very elementary forms of musket and pistol available, till, in the early seventeenth century, the lance had completely disappeared, and the cavalry of that day, though still armoured to some extent,

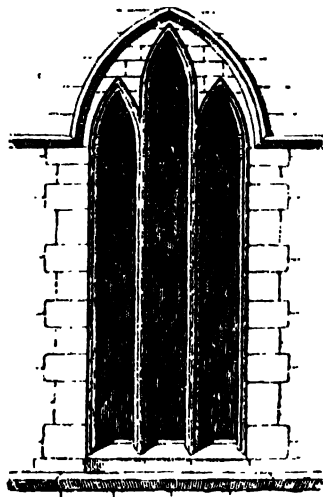
were armed merely with a sword and some form of fire-arm, and trusted entirely to fire action to the entire exclusion of their proper sphere of shock action. They had become, in fact, merely dragoons (in the original meaning of the word), and made no use of the *arme blanche*. In the Thirty Years' War Gustavus Adolphus of Sweden, seeing that he was losing more than half the value of his cavalry, changed the universal system and trained his horsemen to make use of shock action, leaving fire action to the infantry and dragoons (mounted infantry). The system thus evolved in time became general, and was followed and improved upon by other captains of that and the following age.

Shock action at speed was now universally recognized as the proper rôle of cavalry, but the sword was the only weapon with which it could be carried out. Pistols, and in later years a carbine, did, it is true, form part of the equipment of a trooper, but the carbine at any rate was of no use when mounted. The word dragoon had by now lost its original meaning, and dragoons were used as heavy cavalry proper. In the second half of the eighteenth century certain regiments of horse were raised in the British service, and called light dragoons; these were armed, according to the prevailing fashion, with sword and carbine. Then, during the wars of the opening years of the nineteenth century, appeared in the French army certain regiments of Polish lancers, which proved to be of considerable value as 'cavalry screens', though in a more sustained action this value was less evident. They were at least true light cavalry, and were armed with an ideal weapon for mounted fighting. The British authorities therefore decided to follow Napoleon's lead, and in consequence ordered, in 1816, certain light dragoon regiments to be reformed as lancers and to exchange the carbine for the lance. A distinctive uniform was also evolved, based to some extent on the original Polish pattern. In its main features this uniform survives to the present day, the most distinctive item being the lancer cap, a tight-fitting helmet with a square flat top, adorned with a plume.

Lancer regiments in the British service are as follows, date of raising being given in brackets. 5th (Royal Irish) Lancers (1798): uniform, blue; facings, scarlet; plume, green. (To be disbanded.) 9th (Queen's Royal) Lancers (1715): uniform, blue; facings, scarlet; plume, black and white. 12th (Prince of Wales's Royal) Lancers (1714): uniform, blue; facings and plume, scarlet. 16th (The Queen's) Lancers (1759): uniform, scarlet; facings, blue; plume, black. 17th (Duke of Cambridge's Own) Lancers (1759): uniform, blue; facings and plume, white. 21st (Empress of India's) Lancers: uniform, blue;

facings, French grey; plume, white. (To be disbanded.)

Lancet Window, a high and narrow window with an acutely arched top. Lancet windows are a marked characteristic of the early English style of Gothic architecture, and are in a great



Lancet Window, Warmington, Northamptonshire.
1240 A.D.

degree peculiar to England and Scotland. They are often double or triple, and sometimes five are placed together, as in the window called the 'Five Sisters' at York.

Lancewood, the popular name of the wood of several trees of the ord. Anonaceæ, as of the *Ozandra virgata*, a native of Jamaica, *Duguetia quitarensis*, a native of Cuba and Guiana, which possesses in a high degree the qualities of toughness and elasticity, and is on this account extremely well adapted for the shafts of light carriages, and all those uses where light, strong, but elastic timber is required.

Lanciano (làn-châ'nō), a city of Southern Italy, in the province of Chieti (Abruzzi-Citeriore) the ancient *Anzanum*. It is the see of an archbishop, and has an ancient cathedral and the remains of a Roman theatre. Pop. 20,000.

Land is the most important form of natural wealth which is susceptible of appropriation, as it is the basis and location of all other forms of material wealth, and also carries with it the accumulated capital which is derived from the labour of past generations. In Great Britain as a result mainly of the permanence of the system of ownership of land based on royal favour, and of the system of entail, the land is owned by a comparatively limited number of individuals, and the property generally is large,

the average size of English estates being 390 acres, as compared with 32 acres in France and 37 acres in Germany. The number of holdings in France and in Germany is five times as great as in England. One-half of the land of the United Kingdom was owned by 7400 individuals, and the other half by 312,500 persons. The cultivable land is usually let out to tenant-farmers, who cultivate it at their own expense, except for certain of the fixtures, which are supplied and maintained by the owner of the land. The tenant-farmers in Great Britain and Ireland number over 1,100,000, of whom more than three-fourths occupy farms of less than 15 acres. As a result, however, of the great increase in direct taxation, both by way of super-tax and income-tax, and also of death duties, there has since the European War been a noticeable movement towards breaking up estates in England and Scotland, which has resulted in many tenants securing possession of their land; while in Ireland, as a result of the Land Purchase Acts, two-thirds of the holdings are owned by the occupiers. Under these Acts over one hundred million pounds sterling has been advanced to enable tenants to purchase their holdings. In Great Britain about 11 per cent of the holdings are owned by the occupiers, while in the United States two-thirds, and in France four-fifths, of the farms are so owned. The amount of the cultivated area of France held by tenant-farmers or *métayers* is less than one-half. The *métayer* (Lat. *medietarius*) is a tenant-farmer who instead of a fixed money-rent pays to the landlord a proportion of his produce in kind, this proportion being usually one-half. The system is gradually dying out in France, but is still common in Italy, Portugal, and the Danube countries, as well as the Southern States of North America, and in some of the West Indian sugar-plantations.

In Great Britain in 1920 there were 325,000 holdings of 1 to 50 acres, and 16,000 over 300 acres. In France there are about 3,000,000 properties under 25 acres, and only 150,000 above 100 acres; 1,750,000 of the population cultivate their own land. In Germany the average holding is about 14 acres; 5,000,000 holdings are under 25 acres and less than 750,000 over 25 acres. Small holdings cultivated by the owner are common in Belgium, Switzerland, Denmark, Norway, Sweden, and other parts of Europe. A movement in this direction, or rather in the direction of small holdings worked by tenants of local authorities, had begun in Great Britain before the European War. The Small Holdings and Allotments Act of 1908 provides for the acquisition of land by county councils if there is a demand for small holdings (1 to 50 acres) in their county, and by borough, district,

or parish councils for allotments (1 to 5 acres). Up to the end of 1914 nearly 200,000 acres had been acquired and let in small holdings, the average size being about 15 acres. There was an enormous but temporary growth of allotments during the European War. This development of municipally owned small holdings is an outcome of the movement for land nationalization, of which the most illustrious pioneer was Alfred Russel Wallace. The movement aims at transferring the ownership of land (but not buildings or 'improvements') to the State, compensation being paid to the expropriated owners. An alternative plan is the proposal to tax land values. This proposal arises out of the peculiar quality of land which distinguishes it from other property, its tendency to increase in value as population increases, independently of any effort on the part of its owner. Various proposals have been made to secure this 'unearned increment' in value for the State, as representing the community which has earned it, and tentative measures for its partial absorption by taxation were adopted in 1910 in Great Britain, but repealed in 1920. An agitation is being carried on by the United Committee for the Taxation of Land Values for their supersession by a general tax on land values, excluding buildings or other improvements. In some of the British colonies municipal rates are imposed exclusively on the value of land, usually with an exemption of improvements. This is the practice in most of the Australian states, in the Transvaal and Cape provinces of South Africa, and in certain provinces of Canada.

The European War and the continental blockade placed the peasants of Central and South-Eastern Europe in a position of advantage by cutting off the competition of Russian and American wheat, and they have not been slow to reap the political reward of their economic strength. There has been a great increase of peasant ownership of the land in various European countries, notably in Russia and Hungary. Peasant ownership is the rule in Bulgaria, Yugoslavia, &c., while legislation has been passed in Greece and Roumania designed to break up large estates by the partial expropriation of their owners.

Landau (län'dou), a town of Bavaria, on the Quich, formerly strongly fortified. It passed from French to Bavarian hands in 1815. The carriages known as landaus derive their name from Landau, where they were first built in the eighteenth century. Pop. 17,000.

Land-crabs, crabs so called from their semi-terrestrial mode of life, their habits leading them to live on land, and away from the sea, even for considerable periods of time. The true land-crabs (Gecarcinidae) occur in Asia, particu-

larly in the Eastern Archipelago; in America, and specially in the West Indian Islands; and in Australia also. The best-known species is *Gecarcinus ruricola*, found in the higher parts of Jamaica, which often proves very destructive to the sugar-plantations. The crabs of the genus *Cardisoma*, represented by the common species *C. carnifex*, and inhabiting the West Indian mangrove swamps and marshes, appear to feed upon both vegetable and animal diet. Among other species of land-crabs may be enumerated the sand-crabs (*Ocypodidae*), with the beckoning or calling crabs (*Gelasimus*), and the *Thelphusidae*, which inhabit freshwater streams, but appear to be equally at home when on land.

Landes (lând), a term specifically applied in France to extensive level and largely barren tracts stretching from the mouth of the Garonne along the Bay of Biscay and from 60 to 90 miles inland, bordered with sand-hills next the sea. They bear chiefly heath and broom, but the seaward side has been largely planted with maritime pine, chiefly to protect neighbouring districts from sudden movements of the sand-dunes and their migration farther inland. A considerable area has been reclaimed by means of a drainage scheme, and the stilts upon which the Landesats used to traverse the more marshy regions are now nearly obsolete. These stilts were once utilized in Scotland to facilitate the crossing of rivers, and are mentioned in Sir Walter Scott's *Quentin Durward*: cf. "I would have known thee, boy, in the landes of Bordeaux . . . like a crane on a pair of stilts".

Landes, a maritime department of France. It has an area of 3604 sq. miles, and contains three arrondissements, Mont-de-Marsan (the capital), Dax, and St. Sever. The fertile lands consist chiefly of the alluvial valleys to the south of the Midouze and the Adour. The vine is cultivated to a considerable extent in the fertile districts, as are also maize and rye; the Landes horses are prominent. Pop. 288,902.

Landgrave (Ger. *land*, country; and *graf*, count), a German title surviving from the time of the Holy Roman Empire, and formerly bestowed upon district governors or upon rulers of small principalities, to distinguish them from counts, inferior in order of precedence and nobility. Landgraviates formerly existed in Thuringia and Lower and Higher Alsace.

Land Laws. In primitive society might is right. The stronger tribe ousts the weaker from the hunting-grounds or pasture lands it covets. Each tribe occupies only what it can hold by force. But as, owing to growth of numbers and other causes, a nomadic life becomes less desirable and the spoils of the chase, though supplemented by the tribal herds, become too precarious as a means of existence, man's atten-

tion is turned to agriculture, and with agriculture comes a more settled existence. For a time the tribal herds remain its chief wealth, and only a comparatively small portion of the land around the settlement is cultivated. Usually the cultivation is in the hands of the heads of families, amongst whom it is annually parcelled out. Pressure of numbers, however, again exerts its influence. More land requires to be cultivated, and cultivated more intensively, and the man who succeeds in getting a good return from his plot naturally objects to a redistribution which may not improbably be to his disadvantage. The more labour he expends upon his plot, the more he comes to regard it as his own by right. If he has the power, he declines to part with it, and as such an attitude becomes generally adopted, it readily gains recognition as a right. The idea of private property becomes established, and the necessity for laws regulating more fully its enjoyment and its transference arises.

In Saxon England the unit was the village. Large pasture lands were held by the villagers in common, and at least the head of each family cultivated a plot, sometimes in conditions of permanence, sometimes under a system of periodical rearrangement. But at the Norman Conquest the sweeping changes wrought on the Continent by the growth of feudalism were introduced into England. The theory of the feudal system (q.v.) is that all land is held of the sovereign, in whom resides the ultimate ownership. Lands were seized by the conqueror, and allotted to his great retainers in return for military services. In course of time these vassals obtained the right to make subordinate grants to others, who thus held immediately of them and mediately of the Crown. Gradually the feudal services fell into disuse, and money payments generally took their place. By the Statute *Quia Emptores* subinfeudation was abolished, but vassals were permitted to sell their holdings, the purchasers stepping into the shoes of the vassals and holding of their superiors. In the reign of Henry VII. power was given to devise land by will, while entails were authorized by the Statute *De Donis*.

In Scotland feudalism took firm hold. Generally the chiefs of the clans became the feudal vassals of the Crown. Subinfeudation was, and is, common, and since 1874 cannot be prohibited. It may go on to any extent. But in early times a vassal could not substitute a person in his place without the lord's consent, i.e. although (unless prohibited) he could grant a subordinate feu of the entire holding to be held of himself, he could not transfer it out-and-out to be held of his superior. This disability has for long been abolished. Its advantage in the days when military service was a necessity, and the superior

was concerned in having a vassal who could render it, is obvious. The Clan Act of 1715 finally abolished military services.

The interest of the superior is known as the *dominium directum*, or superiority, because feudally it is the superior right, while that of the vassal is termed the *dominium utile*, or property, because he has the more profitable interest, the *de facto* ownership.

Generally speaking, apart from contract, the owner of land has the right to do what he pleases with it. Thus he may build on it, cultivate it, excavate it, sell it, let it, burden it, give it away, or bequeath it. His use of it, however, must, as a general rule, not be such as to interfere with the rights of others, nor such as to create a nuisance. Accordingly he must not dig upon his lands to such an extent as to bring down the lateral support of the adjacent lands. He has exclusive possession, and may therefore prevent unauthorized persons from going on to his lands, i.e. trespassing; but a trespasser is liable only in civil damages unless his trespass has been in pursuit of game.

The ownership of land is said to be 'a coelo usque ad centrum'. The minerals, therefore, belong to the owner of the surface, and he may prevent tunnelling. The minerals, however, may be sold as an estate separate from the surface, in which case the owner of the minerals has no right, apart from contract, to bring down the surface; but if in carrying on operations in the usual way he drains off underground water from the neighbouring lands, no action of damages will be against him therefor. Possibly, too, no one is entitled to fly over land without the owner's consent. The Aerial Navigation Act prohibits flying over certain defined areas.

Standing water, such as a lake, belongs to the owner of the land. He has also the right to use a stream flowing through his land, but, as a general rule, he must neither interfere with its nature nor its flow. The soil of rivers which are not tidal belongs to the Crown, but the rights of fishing in streams belong to the owner of the land. If a stream runs between adjacent estates, the boundary is the 'medium flum'.

Land may be conveyed subject to any easements (q.v.) or rights. Unlike an easement, a title to land in Scotland cannot be acquired by prescription. In Scotland, however, prescription operates, and a good title to land can be acquired by possession for twenty years on an *ex facie* valid irredeemable title. Thus A, of full age, having a defective title, or even no title, to a certain piece of land, conveys it absolutely to B, and B records the conveyance and possesses on it for twenty years; B has a valid title which even the true owner cannot reduce.

In England registration of title is largely optional; in Scotland no real right is complete without it.

See also the articles on *Compensation*; *Fee*; *Few*; *Heir-in-Law*; *Inclosure Acts*; *Land Values*; *Mortmain*; *Primogeniture*; &c. — BIBLIOGRAPHY: Sir H. S. Maine, *Village Communities*; F. Seebohm, *The English Village Community*; Boyd Kinnear, *Principles of Property in Land*; Sir F. Pollock, *The Land Laws*; J. Williams, *Law of Real Property*; J. A. Strachan, *The Law of Property*.

Land League, an organization projected by Parnell, the leader of the Irish national movement, in 1879, the ostensible object of which was to purchase the land of Ireland for the people of Ireland. Funds were largely subscribed, especially in America, but the stringent rules against landlords and tenants holding aloof from it, and the complicity of its members with many terrible outrages, caused it to be declared an illegal association in Oct., 1881, and to be suppressed. After the suppression of the Land League a political and agrarian organization called the *National League* was formed. Its main objects were understood to be the reform of the land laws, the weakening of the power of the landlords, the increase of peasant proprietors, and the establishment of some kind of independent or semi-independent government for Ireland.

Landlord and Tenant. The relationship of landlord and tenant is constituted when one who is owner of, or who has a legal interest in, lands, houses, or other subjects (the landlord or lessor) lets out the same to another person (the tenant or lessee) in consideration of a capital sum (a *grassum*) or of an annual return (rent) or of both *grassum* and rent. The agreement of let is termed a lease (q.v.). In England a lease for a period not exceeding three years is valid if made by deed, by informal writing, or by verbal contract followed by possession. Beyond three years a lease is good only if constituted by deed. The term of the let may be for a life or lives, for a period of years, or at will. A tenant in tail or for life can grant a lease (other than a mining or building lease) only for twenty-one years. A lease or agreement for lease reduced to writing must bear an *ad valorem* stamp, the value being determined by the consideration or the term of endurance.

Apart from agreement, there is generally no obligation on either the landlord or the tenant to keep the premises in repair, and even if the tenant expressly undertakes to leave the premises in the condition in which he got them, he is not liable for ordinary tear and wear. He must, however, use the premises in a proper manner and make good any damage (other than ordinary depreciation by tear and wear) which he or his

household may negligently cause, e.g. by vacating the premises during the currency of the let and leaving them unoccupied; and if he covenants to do the repairs and the premises are destroyed, he must replace them. In letting furnished or working-class houses the landlord is held to warrant them as fit for human occupancy, and if they are not so, the tenant may rescind the contract and be free of the rent. Apart from special agreement, a lease is not rescinded by destruction of the premises, e.g. by fire, but the landlord is not obliged to rebuild. It is therefore advisable to stipulate in the lease that in the event of the complete or partial destruction of the subjects the landlord shall rebuild or restore them within a stated time, and that should he fail to do so the liability of the tenant shall cease. In agricultural leases there is an implied obligation on the tenant to maintain the hedges and fences and to cultivate the land in accordance with the custom of the country. At his outgoing he is entitled to compensation for improvements on the holding effected by him during his tenancy.

Unless expressly prohibited, the tenant may underlet the premises, but he remains liable for the rent should the landlord decline to accept the subtenant as tenant-in-chief.

If the lease is for a fixed period, it comes to an end by mere effluxion of time, and notice is not required to terminate it. In lets from week to week, month to month, or quarter to quarter, the notice required is respectively a week, a month, and a quarter; in lets from year to year, six months; in agricultural leases, one year. A tenancy at will is terminable at the pleasure of either party after reasonable notice.

At the expiry of the let the tenant must deliver up full possession of the subjects (even if he has sublet them), together with all the buildings, erections, and fixtures, other than fixtures introduced for the purposes of trade, agriculture, convenience, or ornament, which may, as a rule, be removed by the tenant before the termination of the let if such removal will not result in material damage to the freehold. Trade fixtures comprise all articles of a chattel nature used for trade although they may be affixed to the freehold, and include furnaces, vats, fire-engines at a colliery, salt-pans, baking-ovens, hydraulic presses fixed in brick and mortar, fixed steam-engines and boilers, the greenhouses and hothouses of a market gardener, and nursery trees and shrubs. Agricultural fixtures are more widely construed, and include engines, machinery, fencing, and even buildings for which no compensation is payable at the tenant's outgoing, and which have not been affixed in virtue of an obligation in that behalf. One month's written notice of

intention to remove them must be given to the landlord, who may elect to purchase them at their fair value to an incoming tenant. Fixtures for convenience or ornament include hangings, tapestries, mirrors, chimney-pieces, window-blinds, grates, book-cases secured to the walls, and brackets.

Generally speaking, chattels and personal effects found on the premises may be distrained for rent; but the goods of a lodger, things in actual use, articles left on the premises in the way of trade, e.g. a watch to be repaired or cloth to be made up into a costume, perishable goods, loose money, goods in a warehouse for safe custody, pledges in a pawnbroker's shop, wearing apparel and bedding, and tools to the value of £5 unless the tenant is holding over (q.v.), live stock and implements if other property is available, and agricultural machinery are privileged.

The Increase of Rent, &c. (Restrictions) Act, 1920, imposes certain restrictions on the right of a landlord to increase the rent of, or to eject the tenant from, any house the rent or rateable value of which at 3rd Aug., 1914 (immediately prior to the outbreak of the European War), did not exceed—in the metropolitan police district, including the City of London—£105; in Scotland, £90; elsewhere, £78. The practical effect of the Act is to give security of tenure at a limited increase of rent so long as there is no suitable equivalent accommodation elsewhere, and provided the tenant is carrying out the conditions of the tenancy. If proper alternative accommodation can be offered, the landlord may recover possession at the normal expiry of the let, but only for the occupancy of himself, an employee, or the employee of a tenant. The Act expires on 24th June, 1923, as regards England, and 28th May, 1923, as regards Scotland.

In Scotland a verbal contract of lease is valid only for one year. Unless otherwise agreed, the landlord must keep urban subjects (houses, shops, manufactories, and the like) in proper repair, and their accidental destruction terminates the contract. Urban leases may be assigned or the subjects sublet, unless expressly prohibited. The landlord has a lien (hypothec) over the goods brought on to the premises (the *invecta et illata*), including furniture on hire, goods for sale or sold but not delivered, and the property of a subtenant to the extent of the sub-rent outstanding, but not including property of a lodger or member of the tenant's family, or articles deposited or lent, or, in small dwelling-houses, the bedding and tools of trade, and such furniture to the value of £10 as the tenant may select. The tenant must keep the subjects plenished. There is now no hypothec over agricultural and pastoral subjects exceeding

2 acres in extent.—**BIBLIOGRAPHY:** E. Foa, *The Relationship of Landlord and Tenant*; Fawcett, *Landlord and Tenant*; Tiffany, *The Law of Landlord and Tenant*; B. W. Adkin, *A Handbook of the Law relating to Landlord and Tenant*.

Landolphia, a genus of climbing shrubby plants, ord. Apocynaceæ, belonging to tropical Africa, Madagascar, &c., and comprising species that are important as sources of rubber.

Landor, Walter Savage, an English poet and prose writer, born at Ipsley Court, Warwickshire, 30th Jan., 1775, died at Florence 17th Sept., 1864. He was educated at Rugby and Oxford, from both of which he was expelled for unruliness. He published a small volume of poems in 1795, and a lengthy poem, *Gebir*, in 1798. This latter he subsequently translated into Latin verse, being one of the most accomplished Latinists of his time. He succeeded to a large property on the death of his father, and resided for a time at Bath, and became an intimate friend of Southey. In 1808 he raised a body of men at his own expense for the defence of Spain against France. In 1811 he hastily married a Miss Julia Thuillier of Bath, and settled at Florence, where many of his works were written. Having separated from his wife, he returned to England in 1835. In 1857 the publication of some ugly slanders against a lady of Bath led to a prosecution for libel, and Landor was brought in for £1000 damages. He left England, and once more found a resting-place in Florence, where he was aided by Browning and visited by Swinburne. A poet of distinction, Landor has always charmed the poets themselves, although his poetry was never widely read. His fame chiefly rests on his *Imaginary Conversations*, between celebrated persons of ancient and modern times, a model of a pure, vigorous, finished English style. Among his other works are: *Count Julian*, a tragedy; *Hellenics or Greek Poems*; *Pericles and Aspasia*, imaginary letters; *Pentameron and Pentologue*; and the dramas *Andrea of Hungary* and *Giovanna of Naples*.—**BIBLIOGRAPHY:** Sir Sidney Colvin, *Landor* (English Men of Letters Series); W. A. Bradley, *Early Poems of Walter Savage Landor*.

Landrecies (lan-dr-see), or Landrecy, a small French town, on the Sambre, department of Nord. It was formerly fortified, and played an important part in the French wars of the seventeenth and eighteenth centuries. During the European War it was the scene of fierce fighting between the French and the Germans. Captured by the Germans after the British retreat from Mons, the town remained in the enemy's possession till the end of the war. Pop. 8700.

Landsberg, a town of Prussia, province of Brandenburg, and 37 miles north-east of Frankfurt, on the Warthe. It has manufactures of

engines and boilers, carriages, woollens, tobacco, and spirits. Pop. 39,800.

Landscape Gardening, a term now generally applied to the natural style of garden design, as distinguished from the formal or artificial. It originated in England in the eighteenth century, as the outcome of a distaste for the French and Dutch styles, which had been imported into this country, and, being based on a love of regularity, symmetry, and laboured art, had become obnoxious to a few men of genius, who preferred to follow nature in the planning and planting of gardens and parks. From the earliest times the set garden has been a feature of the homes of the wealthy, but, as in all other matters of taste, the style of garden has varied from the fantastic and whimsical to the simple and natural. The influence of art, of a love of the beautiful, is always subject to what is known as fashion and taste, and for this reason no one style of garden can ever become universal or even general. Good judges consider the English or landscape style to be perfect; others prefer the more formal or architectural style; whilst a third school favours a judicious combination of the two. It has been urged, not without reason, that true art in the garden can never be a slavish reproduction of nature, any more than other arts, music and architecture for example, are. Art is nature tamed and adapted. Our most successful landscape gardeners follow nature as far as suits their purpose, never overlooking such essentials as suitability and convenience. To be able to realize the right treatment of a given site for a garden, and to produce one that would satisfy the true artist, a landscape gardener must possess a knowledge based largely on a careful observation of nature's ways, and be gifted with imagination. The art of the garden-maker is akin to that of the painter of pictures, as it must be inspired by a careful study of nature and a knowledge of the accepted principles of his craft.

Landseer, Sir Edwin Henry, painter, born in London 7th March, 1802, died there 1st Oct., 1878. As a child he began to draw animals; at thirteen he exhibited at the Academy, and the year following became a student. From that time onwards he exhibited regularly at the Academy and at the British Institution. In 1826 he was elected A.R.A.; in 1830, R.A.; in 1850 he was knighted; and in 1865 he declined the presidency of the Royal Academy. He takes high rank among animal painters; and though he has been blamed for introducing too human a sentiment and expression into some of his animals, the humour and pathos of animal nature are well expressed in his work. But he is often weak in design, colour, and anatomical construction. A great many of his paintings are in the National

Gallery. Among his best-known works are: *The Cat's Paw* (1824); *The Return from Deer-stalking* (1827); *High Life, and Low Life* (1831); *There's Life in the Old Dog Yet* (1838); *A Dialogue at Waterloo* (1850); *Monarch of the Glen* (1851); *Uncle Tom and his Wife for Sale* (1857); *Swannery invaded by Sea-eagles* (1860); and the celebrated *Lions* at the base of Nelson's Monument, Trafalgar Square.—Cf. J. A. Manson, *Makers of British Art*.

Land's End, a granite headland in Cornwall, some 60 feet high, forming the south-western extremity of England (lat. 50° 6' N., long. 5° 45' W.). There is a lighthouse on the Longships, a group of dangerous rocks about a mile to the west.

Landshut (länts'höt), a picturesque old town of Bavaria, on the Isar, 38 miles N.E. of Munich. It has many interesting buildings, among which are St. Martin's Church, a fine Gothic structure built between 1407 and 1477, with a steeple 462 feet high; the royal palace, formerly the residence of the Bavarian dukes, the reconstructed fifteenth-century town house, and the ruined chapel of the old castle of Trausnitz. Landshut has manufactures of leather, starch, machinery, carriages, tobacco, paper, &c. It formerly had a university, transferred in 1800 from Ingolstadt, but removed to Munich in 1826. Pop. 24,000.

Landaknecht, a German term for the mercenary foot soldiers, armed with pikes (lances) and swords, first organized by the Emperor Maximilian I in 1487. The term was employed to distinguish these 'fellows of the plain' from the Swiss mountaineers, also employed as mercenary soldiers. Sir Walter Scott, in *Quentin Durward* (chap. xvii), describes a 'Lanzknecht': "His whole equipment was that of one of the German adventurers, who were known by the name of *Lanzknechts*, in English 'spearmen', who constituted a formidable part of the infantry of that period. These mercenaries were a fierce and rapacious soldiery . . . and a *lanzknecht* was once refused admittance into Heaven on account of his vices, and into Hell on account of his tumultuous, mutinous, and insubordinate disposition . . . they manfully acted as if they neither sought the one nor eschewed the other." The French is *lansquenet* (q.v.), from which a card game derives its name.

Landskrona, a seaport of Sweden, län Malmö, on a tongue of land projecting into the Sound, 18 miles N.N.E. of Copenhagen. Its harbour is the best on the Swedish coast of the Sound. Pop. (1920), 10,542.

Landslip, the slipping or sliding of a considerable tract of land or earth from a higher to a lower level. Landslips are due to a variety of causes, such as earthquakes, the penetration

of permeable rocks by water forming a surface of sliding on some underlying impermeable layer, or on coasts the undermining action of the sea. Among the more disastrous occurrences of this kind are the slip of the Rossberg behind the Rigi in Switzerland in 1806, burying villages and hamlets with 457 of their inhabitants; and that at Naini Tal, a sanitary hill-station in the Himálaya in 1880, when 230 lives were lost.

Landsturm, the German equivalent for *levée en masse*, a local militia of Germany until 1918, which was only called up for home defence and in case of actual invasion. It comprised that portion of the reserve which was too old for the *Landwehr* (q.v.), and consisted of soldiers who had completed their term of service with the first line, reserve, and *Landwehr*, and of untrained troops between the ages thirty-nine and forty-five. During the European War the Landsturm was required to undertake foreign service.

Land Values, Taxation of, a phrase which has recently been much before the public and which implies different schemes according as it is used by different persons. In its extreme form the taxation of land values means the taxation of land to the full amount of its rentable value, and practically the expropriation of landlords and the confiscation of their property by the State. In a narrower and more plausible form it is connected with the 'unearned increment' question; that is, the increase in the value of lands and building sites in or about towns, such increase being attributed to the growth of population and not to anything done by the landowner, who is often accused of holding back land and keeping it out of the market in order that he may in time obtain a much enhanced price. Taxation of land or site value in such cases is asserted by its advocates to be quite reasonable, as giving to the community a share at least of the value created by itself. Duties were imposed by the Finance Act, 1900–10, as follows: (1) *Increment Value Duty* payable on the transfer or sale of land or any interest in land, on any lease for more than fourteen years, or on the passing of land or interest in land by death; the amount of the duty being £1 for every £5 of 'increment value', i.e. the increase in the value of the *site* over the original site value at 30th April, 1900, or since the last payment of duty; (2) *Reversion Duty* payable by a lessor on the determination of a lease of land for a term exceeding twenty-one years, duty being payable at the rate of £1 for every £10 of the value of the benefit accruing thereby; (3) *Undeveloped Land Duty* of $\frac{1}{2}$ d. per £1 per annum on the site value of any land not developed by the erection of houses or buildings for the purposes of a trade or business other than agri-

culture; and (4) *Mineral Rights Duty* of one shilling annually per £1 of the rental value of minerals on lease or worked by the proprietor. In each case there were exemptions, the principal ones in the first three cases being agricultural lands, and in the last case clay, sand, chalk, limestone, and gravel. These duties were expensive to collect and disappointing in their yield (in the year 1919-20 they produced only £603,000), and all but the last were abolished in 1920.

Landwehr, a term applied to certain classes of conscripted troops in Germany, Austria, Russia, and Switzerland. In Switzerland the Landwehr is the second line, to which a man is drafted for 12 years on the expiry of his line and reserve service. The German and Russian Landwehr were also second-line forces, and the Austrian was an overflow force for troops supernumerary to line establishment or requirements.

Lanfranc, Archbishop of Canterbury, son of a wealthy citizen of Pavia, Italy, born 1005, died 1089. He became a monk of the Benedictine abbey of Bec in 1042, and prior in 1046. In 1062 William of Normandy made him Abbot of Caen, and after the Conquest he became Archbishop of Canterbury (1070). He did much to purify and reform the Church, at the same time preserving its insular independence. He enjoyed the confidence of William I, and promoted the peaceable succession of William Rufus, under whom he exercised the chief authority till his death. His writings were printed in 1047, and again at Oxford in 1844.

Lang, Andrew, Scottish author, born at Selkirk 1844, died 1912. He was educated at Edinburgh Academy, St. Andrews, and Balliol College, Oxford, subsequently becoming an honorary fellow of Merton College, Oxford, and a Fellow of the Royal British Academy (1906). He was a most versatile writer, producing upwards of sixty books, in addition to an enormous number of casual essays and journalistic articles published in Great Britain and in the United States. He published several volumes of ballads and light verse, including *Ballads and Lyrics of Old France* (1872), *Ballads in Blue China* (1880), and *Ballads of Books* (1888). He made valuable contributions to the literature of mythology in *Custom and Myth* (1884) and *Myth, Ritual, and Religion* (1887). In collaboration with Professor Butcher he translated the *Odyssey*; with Myers and Walter Leaf, the *Iliad*; and he collaborated, in *The World's Desire*, with Sir Rider Haggard. The following are others of his most important works: *Grass of Parnassus* (1888), *How to Fail in Literature* (1890), *Ban et arrière Ban* (1894), *The Homeric Hymns* (1899), *History of Scotland from the Roman Occupation*, *Prince Charles Edward* (1900), *Magic and Religion* (1901), *Mystery of*

Mary Stuart (1901), *Homer and his Age* (1906), *A Defence of Sir Walter Scott and the Border Minstrelsy* (1910).

Langeland, an island of Denmark between Lolland and Fünen, about 30 miles in length and from 3 to 5 miles in breadth; area, 100 sq. miles; pop. about 20,000. Rudkjøbing is the chief town, and has railway connections. Dairy-farming is an extensive industry; legumes, cereals, and other farm crops are raised.

Langensalza (lång'en-zal-tsá), a town of Prussia, in Saxony. It has cloth and other factories. Three battles have been fought in the vicinity of Langensalza. On 27th June, 1806, the Hanoverian army defeated the Prussians, but was forced to capitulate two days later. Pop. 12,700.

Langkat, a town of Sumatra, on the north part of the east coast, with a port. It possesses petroleum wells, from which large shipments are made.

Langland, William, the supposed author of the English poem *The Vision of William concerning Piers Plowman*, was born about 1332 perhaps at Clebury-Mortimer, Shropshire, and is traditionally reported to have been a secular priest, educated at Oxford. From internal evidence it is gathered that the poem, in its earliest form, was composed about 1362. Its rhythmical structure depends upon alliteration, which forms a substitute for rhyme. The poem is allegorical in form and satirical in spirit; the trials and troubles of life generally, but more particularly the corruptions of the Church and the worldliness of the ecclesiastical order, are its theme. *The Crede of Piers Plowman* is an imitation of Langland's work which appeared about the end of the fourteenth century. It is written by a follower of Wycliffe. There are three chief texts of *Piers Plowman*, to which are assigned the respective dates of 1362, 1377, and 1392—all published by the Early English Text Society, Professor Skeat being editor. He also published a parallel text edition (2 vols., 1886). *Piers Plowman* is of value for its pictures of old English life, and of very great importance for the study of English in its earlier forms. Langland is believed also to be author of a poem written in 1399, which Skeat called *Richard the Redeless*.— Cf. J. A. A. J. Jusserand, *A Literary History of the English People*.

Langres (lång-gr), a town of France, department of Haute-Marne, near the left bank of the Marne, and s.w. of Chaumont. It occupies a steep hill commanding the entrance from the basin of the Saône into that of the Seine, and is a fortress of the first class. It was known to the Romans as Andematunum, and is believed to have derived its name from the Celtic people Lingones, who occupied the town in Caesar's time.

It has a cathedral, chiefly Romanesque but partly Gothic, dating from the twelfth century. Pop. (1911), 6335.

Langside, now a southern suburb of Glasgow, included in the municipality in the parish of Cathcart, formerly a small village where the troops of Mary Queen of Scots were utterly defeated by the Regent Murray on 13th May, 1568. It was from Langside that Mary fled to England, and a monument commemorates the battle.

Langton, Stephen, English cardinal, and Archbishop of Canterbury in the reign of John, born about 1150, died 9th July, 1228. In 1206 Innocent III created Langton a cardinal and nominated him to the see of Canterbury, consecrating him archbishop in the following year. King John refused to accept him, and it was only after England had been placed under an interdict and John excommunicated and threatened with deposition that he yielded. Langton was acknowledged in July, 1213, and in August he joined the insurgent barons, and acted with them in compelling John to sign Magna Charta. He crowned Henry III, and in 1223 he demanded of him the full execution of the Charter. He was the author of some theological treatises.—Cf. W. Stubbs, *Historical Introduction to the Rolls Series*.

Languedoc (lân-gé-dok), one of the pre-Revolutionary provinces of Southern France, now forming the departments of Aude, Tarn, Hérault, Lozère, Ardèche, and Gard, as well as the arrondissements of Toulouse and Villefranche, in the department of Haute-Garonne; and the arrondissements of Puy and Yssingeaux, in the department of Haute-Loire.

Langue d'oc (lân-gé-dok), the name given to the independent Romance dialect spoken in Provence in the Middle Ages, from its word for *yes* being *oc*, a form of the Latin *hoc*. It was thus distinguished from the language spoken by the natives of the north of France, which was called *Langue d'oui* or *Langue d'oïl*, their affirmative being *oui* or *oïl*. The *langue d'oc* was the language of the Troubadours, and is known also as *Provençal*.

Lankester, Sir Edwin Ray, British scientist, born 15th May, 1847. Educated at St. Paul's School and at Oxford, he was lecturer at Exeter College, Oxford, and subsequently was professor of zoology at University College, London, and Linacre professor of comparative anatomy at Oxford (1891-8). From 1898 to 1907 he was director of the Natural History Museum, South Kensington, and was knighted in 1907. He founded the Marine Zoological Association, and was president of the British Association in 1906. His numerous works, wherein he follows the theories of Darwin and Huxley, include: *Degeneration*, *The Advancement of Science*, *The Kingdom*

of Man, *Half-hours with the Microscope*, *Secrets of the Earth and Sea*, and *Science from an Easy Chair*.

Lannes (lân), Jean, Duc de Montebello, Marshal of France, born at Lectoure 1769, and was mortally wounded 21-22nd May, 1809, during the battle of Aspern-Essling. He died 31st May, 1809, at Vienna. Of humble parentage, Lannes was by trade a dyer, but he enlisted in 1792 and served in Spain and in Italy, where, in 1796, he held a command as brigadier-general. He accompanied Napoleon to Egypt in 1798, but returned to Italy in 1800 and gained the victory of Montebello. That of Marengo was mainly due to the strategy and daring of Lannes. In 1801 he became Envoy to Portugal, and subsequently had a chief command at Austerlitz, Jena, and Friedland (1805-7), and in 1808 he marched into Spain and took Saragossa.

Lansdowne, William Petty, first Marquess of, better known as Earl of Shelburne, born 1737, died 1805. He began political life in 1763; became Prime Minister in 1782, but was driven from power by the Fox and North coalition. In 1784 he was made Marquess of Lansdowne.—His second son, Henry Petty, born 1780, died 1863. He succeeded his brother as Marquess of Lansdowne in 1809; was a successful debater in Parliament, generally acting with the Whig party. In 1827 he was Home Secretary; from 1831 to 1841 President of the Council. He was leader of the opposition in the House of Lords from 1841 to 1846, when he entered the Cabinet of Lord John Russell as President of the Council. In 1852 he declined the premiership.

Lansdowne, Henry Charles Keith Fitz-Maurice, fifth Marquess of, was born 1845, and succeeded to the marquessate in 1866. He was Governor-General of Canada from 1883 to 1888, of India from 1888 to 1893, Secretary for War from 1895 to 1900, and Foreign Secretary from 1900 to 1905. He was Unionist leader in the House of Lords from 1906 to 1914. In 1915 he joined the Coalition Government as Minister without portfolio, but resigned in 1916, as he was not in accord with his colleagues on the Irish question. In Nov., 1917, Lansdowne advocated overtures for peace with Germany in a letter published in *The Daily Telegraph*.

Lansing, Robert, American lawyer-diplomatist, born 1864, was admitted to the Bar in 1889, and represented the United States in the Behring Sea Arbitration of 1892-3. He came into prominence as an international negotiator, and was frequently retained by the United States in this capacity. During 1914-5 he was Counselor for Department of State, and replaced W. J. Bryan in 1915 as Secretary of State under President Wilson. He accompanied the American Peace delegation to Versailles as Commissioner. Owing

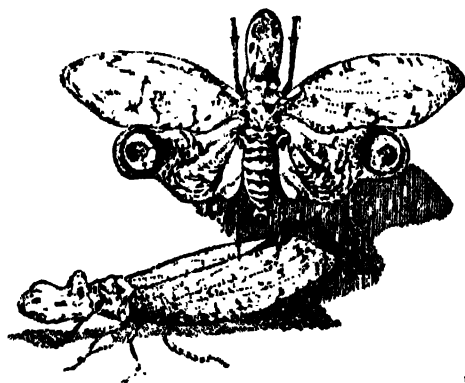
to a dispute with President Wilson, he resigned in 1920.

Lansing, a town of the United States, capital of Michigan, on Grand River, north-west of Detroit. It has a large State house with a library of over 100,000 volumes, an agricultural college, and many important manufactures. Settled in 1887, it became a city in 1889. Pop. 57,327.

Lansquenet, a French card game, deriving its name from the German *Landsknecht* (q.v.), who introduced it into France in the fifteenth century.

Lantern, in architecture, (1) an erection on the top of a dome, on the roof of an apartment, or in similar situations, to give light, to promote ventilation, or to serve as a sort of ornament. (2) A tower which has the whole or a considerable portion of the interior open to view from the ground, and is lighted by an upper tier of windows, such as the towers commonly placed at the junction of the cross in a cruciform church; also a light open erection on the top of a tower.

Lantern-flies, tree-bugs allied to the cicadas, but forming a family by themselves, the Fulgoridae. They are remarkable for the prolongation of their forehead into a snout-like expansion



Lantern-fly (*Fulgora lanternaria*)

that appears to be a leaping organ. The lantern-fly proper (*Fulgora lanternaria*) is a native of South America. It is more than 3 inches in length, and 5 inches across the wings. It has been asserted that it emits a strong light from the inflated expansion of the forehead, but the evidence of this luminosity is more than doubtful. They are in fact reported to fly only during sunlight and not to appear abroad during dark. A Chinese species has, on equally equivocal testimony, been called *F. candelaria*.

Lanthanum (symbol, La; atomic weight, 139.0). An element resembling cerium, belonging to the group known as the rare earth metals, found in the monazite sand of Travancore, India, and of Bahia and Espirito Santo, Brazil. It is

found associated with didymium in the minerals cerite and lanthanite. The element is obtained from its compounds by electrolysis of fused lanthanum chloride, (LaCl₃), and is one of the most chemically active of the rare earths. It exhibits pyrophoric properties like cerium.

Lanzarote (lan-sa-rō'lä), the most north-eastern of the Canary Isles; greatest length, 86 miles; mean breadth, 15 miles. Its coast is generally bold, and the hills in the centre rise to an elevation of 2000 feet. The island is of volcanic origin, and one volcano is still active. It produces grapes, &c. The capital is Arrecife. Pop. 19,261.

Laocoon (lä-ok'o-on), in ancient Greek legend, a priest of Poseidon (Neptune), among the Trojans, who, along with his two sons, was killed by two enormous serpents sent by Apollo. The story has frequently furnished a subject to the poets, but it is chiefly interesting as having served as the subject of one of the most beautiful groups of sculpture in the whole history of ancient art. It was discovered at Rome among the ruins of the palace of Titus in 1506, and is now in the Vatican Museum. According to Pliny, the group was the work of three sculptors of Rhodes, a father and two sons, Agesander, Polydorus, and Athenodorus. Their date has now been established by the discovery in Rhodes of a statue of a priest of Athena, the date of which is 42 B.C., and which is undoubtedly the work of Agesander and Athenodorus. The statue, therefore, antedates Virgil's narrative in the *Æneid*.—Cf. E. A. Gardner, *Handbook of Greek Sculpture*.

Laodice'a, the ancient name of several places in Asia Minor. One of these, now called *Eski Hissar* (Old Castle), 120 miles S.E. of Smyrna, was the site of one of the seven primitive Christian churches of Asia. Another is now known as *Latakia*.

Laon (län; ancient Bibrax Suessionum), a town of France, capital of the department of the Aisne, 87 miles north-east of Paris. It is situated on a height in the midst of a level country, and has interesting old buildings, especially the former cathedral, which dates from the twelfth century. Laon was the seat of a bishopric as early as A.D. 500, and was made the capital of his kingdom by Charles the Simple of France about 900. Bonaparte was defeated here in 1814. On the 9th Sept., 1870, it surrendered to the Germans without a blow being struck. Laon is an important fortress, and was captured by the Germans during the European War on 30th Aug., 1914, remaining in the enemy's possession for over four years, when it was retaken by the French on 18th Oct., 1918. Pop. 16,000.

La'os, a French protectorate, tributary to Indo-China, but governed by a king and advised

by a French Resident, administrative expenses being borne by Cochin-China, Annam, Tonkin, and Cambodia. The protectorate was declared in 1892-3, but part of the Prabang territory was restored to Siam 28th March, 1907. The area is about 98,000 sq. miles, and the population upward of half a million. There are three districts, Luang Prabang, Bassac, and Muong Sing, and cotton, rice, tobacco, indigo, and fruit are produced. Gold and precious stones are being worked by French concessionaires.

Lao-tze, or **Lao-tseu**, sometimes also called **Lao-Klun**, Chinese philosopher, founder or reformer of one of the most ancient and important religious sects of China, known as the Tao, or sect of reason. Born about the year 600 B.C., he was historiographer and librarian to a king of the Chow dynasty; he travelled to the borders of India, where he may have become acquainted with Buddhism; he met Confucius and reproached him for his pride, vanity, and ostentation; he was persuaded to record his doctrines in a book, which he did in the *Tao-ti-king* or *The Path to Virtue*; and, on completing this task, he disappeared into the wilderness, and there, it is said, ascended to heaven. According to him, silence and the void produced the Tao, the source of all action and being. Man is composed of two principles, the one material and perishable, the other spiritual and imperishable, from which he emanated, and to which he will return on the subjugation of all the material passions and the pleasures of the senses. Lao-tze's moral code is pure, inculcating charity, benevolence, virtue, and the freewill, moral agency, and responsibility of man. From the insight and deep wisdom of his moral code it has been supposed that Lao-tze had been indebted to Western teaching, but there is no clear proof of this. Since the second century of our era the sect has continued to extend over China, Japan, Cochin-China, Tonquin, and the Indo-Chinese nations.

Lapageria, a genus of Chilean climbing plants, ord. Liliaceæ. *L. rosea*, with handsome red or white flowers, is a great ornament of the greenhouse.

La Paz, the principal commercial city of Bolivia, and the focus of all Bolivia's chronic political disturbances. Grandly situated at the lower end of Lake Titicaca, it lies in a deep hollow, and far above towers the summit of Illimani (q.v.). Its Plaza de 10th Julio is 12,000 feet above sea-level, and train passengers are provided with oxygen to enable them to withstand height sickness, &c. The old palace of the Spanish Governors has become an hotel; the cathedral is unfinished, and the local diversion (apart from politics) is bull-fighting. La Paz, founded 1548, contains a university, a museum

and a mineralogical museum, a wireless station, and a railway station in connection with Huagui (Titicaca), a whence steamers maintain a service with the Peruvian terminus at Puno. Pop. (1918), 107,252.—The province of La Paz has an area of 40,686 sq. miles, and a pop. (1915) of 726,357.

La Pérouse (pâ-rôz), Jean François Galaup, Comte de, a French navigator, born 22nd Aug., 1741, died in 1788. In 1785 he left France in charge of a Pacific exploring expedition, and, having visited parts of its western and eastern coasts and sundry of its islands, the expedition arrived in Botany Bay in 1788. Here La Pérouse left a letter, in which he declared his intention of proceeding to the Isle of France, but nothing more was heard of him. In 1826, however, an English captain, Dillon, found some remnants of the wreckage of La Pérouse's ships in possession of the inhabitants of Vanikoro, one of the New Hebrides. In 1828 an expedition sent out under Dumont d'Urville discovered that La Pérouse's two vessels, the *Boussole* and *Astrolabe*, struck on a reef in the New Hebrides, and that the crews were either drowned or murdered.

Lapis Lazuli, a rock mainly composed of an aluminous sodium calcium silicate with some sulphur, of a rich azure-blue colour. The finest specimens are brought from China, Persia, and Central Asia, and it is much esteemed for ornamental purposes, especially for inlaid work. From it the pigment called ultramarine is prepared, but this is now also manufactured artificially.

Laplace (là-pläs), Pierre Simon, Marquis de, a celebrated French mathematician and astronomer, born 1749, died 1827. At an early age he showed wonderful aptitude for mathematics, became professor of mathematics at the École Militaire; subsequently went to reside in Paris, and there made the acquaintance of d'Alembert. Under his guidance Laplace soon distinguished himself by discovering the invariability of the mean distances of the planets from the sun. He was appointed examiner of the Royal Corps of Artillery, and at the early age of twenty-four was admitted into the Academy of Sciences. During the Revolution Laplace was an extreme Republican, and in 1799 he was nominated to the Ministry of the Interior—a position which he filled so badly that he was superseded in six weeks. Receiving the patronage of Bonaparte, he was made President of the Senate, and in 1806 raised to the dignity of Count of the Empire. Notwithstanding these favours, he deserted the emperor in 1814, voted for the establishment of a Provisional Government, and was rewarded by the Bourbons with the title of marquis. In 1810 he was named a member of the French Academy. Almost any one of Laplace's original researches is

alone sufficient to stamp him as one of the greatest of mathematicians. The discovery of the invariability of the major axes of the planetary orbits, the explanation of the great inequality in the motions of Jupiter and Saturn, the solution of the problem of the acceleration of the mean motion of the moon, the theory of Jupiter's satellites, and other important laws are due to Laplace. The most important of his works are: the *Mécanique céleste*, *Système du monde*, *Théorie analytique des probabilités*, and *Essai sur les probabilités*.—Cf. D. F. J. Arago, *Biographies of Scientific Men*.

Laplace's Equation, in mathematical physics, is the partial differential equation $\frac{d^2V}{dx^2} + \frac{d^2V}{dy^2} + \frac{d^2V}{dz^2} = 0$. The independent variables x, y, z are the Cartesian co-ordinates of a point in space. In Laplace's original investigations the function V was the gravitational potential (q.v.) of a body at any point (x, y, z) external to it. Among other functions which satisfy the equation are (a) the potential in an electrostatic field at a point where there is no charge, and (b) the steady temperature in a body through which heat is flowing. See *Potential*; *Spherical Harmonics*.

Lap'land, the geographical term for the land of the Lapps. The word means more when considered ethnographically, for Lapland has actually no political existence as a separate or even a clearly defined state, but runs roughly west to east from Norway over the north of Sweden and part of Finland to the Russian Kola Peninsula. The climate for nine months of a dark winter is excessively cold; spring and autumn are short; and the summer of two months, when the sun never sets, is extremely hot. Vegetation is scanty, except in the form of birch, pine, fir, and the abundant mosses which supply food for the herds of reindeer.

The Lapps themselves belong to the Finnic branch of the Turanian family, and the Finns dwelling in Torne (Sweden) are ethnologically not very far removed from them. They are a small, muscular, large-headed race, with high cheekbones, wide mouth, flat nose, and scanty beard, and many are of nomadic habits, although the tendency towards intermarriage with the Finns and Swedes has done much towards converting them to a settled, semi-agricultural life. They are generally very ignorant, simple-hearted, and hospitable.

The Norwegian Lapps belong to the Lutheran, and the Russian Lapps to the Greek Church. Their numbers do not exceed 30,000, of which about 19,000 are registered in Norway, 8000 in Sweden, and 2000 in Finland.—BIBLIOGRAPHY; F. H. Butler, *Through Lapland with*

Skis and Reindeer; E. Rac, *The White Sea Peninsula*.

La Plata, a city of the Argentine, situated on a fine natural harbour called Ensenada, in the La Plata estuary, 40 miles below the city of Buenos Ayres, and connected with it by rail. Founded in 1882 as the capital of Buenos Ayres province, it has become an important commercial centre, having a palace for the Legislative Assembly, a cathedral, a national university, and public park. Pop. 106,400.

Laporte, a city of the United States, capital of Laporte county, Indiana, 60 miles south-east of Chicago. The neighbourhood has become a favourite resort of summer visitors on account of its beautiful lakes. Pop. 12,500.

Lapwing, Peewit, or Green Plover, a bird belonging to the plover family. The common lap-



Lapwing (*Vanellus cristatus*)

wing (*Vanellus cristatus*), a well-known British bird, is about the size of a pigeon; it is often called the *peewit* from its peculiar cry. In the breeding season these birds disperse themselves over the interior of the country, where they lay their eggs in a small depression of the ground, in cultivated fields, moors, &c. Both eggs and young are protectively coloured, harmonizing with their surroundings so as to be inconspicuous. In winter they retire to the sea-coast. Lapwings destroy great numbers of insects, and are beneficial to agriculture. Their eggs are considered a luxury, and many are annually sent to the London markets.

Lar'amie, a town of Wyoming, United States, in the south-east of the state in an elevated region, at the height of 7100 feet, beside the Laramie Plains, River, and Mountains. Pop. 8207.

Laramie Series, the youngest member of the

Cretaceous system in the west-central region of the United States, consisting mostly of strata laid down in fresh or brackish water, and including much lignite. It forms an important link with the local terrestrial Eocene system; dinosaurs, however, often of large size, continued to live in Laramie times, in contrast with the mammalian life of the Cainozoic series.

Lar'ceny is the fraudulent appropriation of the personal property of another person without that person's consent. To constitute this crime the removal of the goods to any distance is not necessary, but it requires to be shown that the article has completely passed, for however short a time, into possession of the criminal. Concerning the kinds of things the appropriation of which is larceny, the common law restricted them to personal property as distinguished from real estate, but this distinction has been largely abolished by recent statutes. Larceny was formerly divided into two kinds, grand and petty, or the difference between articles above and below the value of a shilling, but this distinction has now been abolished. At one time the punishment for grand larceny was death; later it was restricted to transportation; now the punishment for larceny is imprisonment or penal servitude, and depends on the previous character of the prisoner.

Larch, the common name of trees belonging to the genus *Larix*, nat. ord. Coniferae, having deciduous leaves, small erect, oval, blunt-pointed cones, and irregularly margined scales. The



Larch (*Larix europaea*)

common larch (*L. europaea*), though a native of Italy, Switzerland, and South Germany, is one of the most frequently cultivated trees in Britain, and is remarkable for the gracefulness of its conical growth, and the durability of its wood. It suffers greatly, especially when grown at low altitudes, from the larch-canker fungus, *Dasy-*

scypha Willkommii. Besides the common larch, there are the Russian larch, the red larch, and the black larch (*L. americana*), a native of America. The last species has also the name of *hackmatack* or *tamarack*.

Lard is obtained from the fat of swine when it is heated to boiling-point and then strained. It is chiefly composed of olein and stearin, and is now largely used in the manufacture of candles, soap, pomades, &c. The best quality is found in the fat which surrounds the kidneys, and this is employed in pharmacy for the preparation of unguents. When subjected to pressure the olein is liberated, forming lard-oil, which is much used as a lubricant for machinery.

La'res, a class of tutelary spirits or deities (domestic and public) among the ancient Romans. All the household lares were headed by the *lar familiaris*, who was revered as the founder of the family. In the mansions of the rich the images of the lares had their separate apartment. When the family took their meals, some portion was offered to the lares, and on festive occasions they were adorned with wreaths.

Largs, a seaside resort of Scotland, county of Ayr, on the Firth of Clyde. In 1263 Alexander III defeated the Norwegians under Hako in the vicinity, and a stone erection perpetuates the victory. The ancient castles of Fairlie, Skelmorlie, Knock, and Kelburne stand near the town, which is a favourite seaside resort of Glasgow residents. Pop. 9450.

Lar'idæ, the family of aquatic birds popularly known as the sea-gulls, sea-mews, or gulls, and of which the genus *Larus* is the type. The skuas, skimmers, and terns are also included. See Gull.

Larissa (Yeni Shehr in Turkish), a town of Northern Greece, on the River Peneus (now Salambría), the capital of Thessaly. It is the seat of an archbishopric, with an important trade and industries, and is connected by rail with the seaport Volo. It is a place of great antiquity, and was ceded to Greece in 1881. Pop. 18,000.

Lark, the common name of perching birds of the family Alaudidæ. They are characterized by a short, strong bill; nostrils covered with feathers; forked tongue; long, straight hind-claw; and the power to raise the feathers on the back part of the head in the form of a crest. Their distribution throughout the Old World is general, but one genus (*Otocorys*) is American and another (*Mirafra*) ranges into the Australian region. They are terrestrial in their habits, feed upon worms, larvae, &c., nest upon the ground, and bring forth a brood twice in the year. The best known is the sky-lark (*Alauda arvensis*), which is celebrated for the prolonged beauty of its song. The wood-lark (*Zonotrichia arborea*) is less common than the sky-lark, and is known by its smaller size

and less distinct colours. It perches upon trees, and is found chiefly in fields near the borders of woods. It sings during the night, and on this account has been mistaken for the nightingale.

Larkhall, a town of Scotland, in Lanarkshire, on the Caledonian Railway, $3\frac{1}{2}$ miles south-east of Hamilton. It is in the Lanarkshire coal-fields, and is a mining centre. Pop. 14,000.

Larkhāna, a town of India, in Sikārpur district, Sind, Bombay Presidency, situated on a fertile tract of land on the south side of the Ghār Canal. Pop. 13,700.

Larkspur (*Delphinium*), sometimes called Lark's-heel, a genus of plants of the ord. Ranunculaceæ, distinguished by its petaloid calyx, the superior sepal of which terminates in a long spur. The upright larkspur (*D. ajacis*) and the branching larkspur (*D. consolida*) are well-known garden flowers.

Lar'naka, or Lar'nica (ancient Citium), the seaport city of Cyprus, with an ample roadstead. It is the chief commercial centre in the island. Many inscriptions in the Phœnician language have been found at Larnaka, which is supposed to be the Biblical Kittim or Chittim. It was the birth-place of Zeno, the founder of the Stoic school of philosophy. Pop. about 10,000.

Larne, a seaport of Ireland, County Antrim, at the entrance to Larne Lough; the Irish port of the short sea-route, Stranraer-Larne (39 miles), carried on by mail steamers. The bleaching of linen is extensively carried on, and there are large flour-mills. The harbour, about a mile below the town, is one of the best on the east coast. Larne ranks high in the list of first-class Irish watering-places. During the European War the town was practically a naval base. Pop. about 8000.

La Rochefoucauld (rōsh-fō-kō), François, Duc de, Prince de Marsillac, a celebrated courtier and man of letters of the time of Louis XIV, was born at Paris 1613, and died there 1680. He distinguished himself as a soldier, but his political career was somewhat stormy. In 1652 he retired to his château, and did not return to Paris till 1661. Meantime he had abandoned the sword for the pen, and associated freely with Boileau, Racine, Molière, Madame de Sévigné, and Madame de la Fayette. His *Mémoires*, published by the Elzéviens in 1662, and his *Reflexions ou Sentences et Maximes morales*, published anonymously in 1665, were the fruits of his literary activity. The latter contain about seven hundred maxims, which not only combine perspicuity with brevity, but are also masterpieces of a finished literary style, brimful of wit and paradox, and the work is rightly considered a French classic. The fundamental thought of the book is that self-interest is the mainspring of all human action. Many editions

of these *Maximes* have been published, but the best is that of 1870 (Edition des Bibliophiles).

La Rochejaquelein (rōsh-zhāk-lan), Henri du Verger, Comte de, seign of an ancient French family of La Vendée, celebrated chief of the Vendean Royalists, was born in 1772. During the French Revolution his father and his two brothers emigrated to England, but Henri put himself at the head of the peasants of La Vendée, and gained sixteen victories in ten months. At the age of twenty-two he was shot by a Republican soldier in a skirmish at Nouaillé, 4th March, 1794.

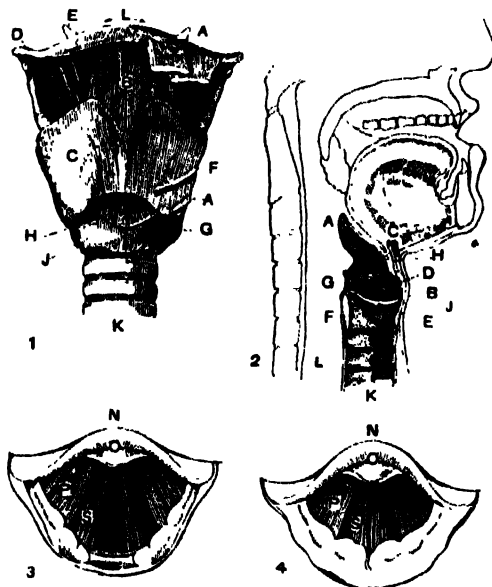
Larva, the term applied in natural history to the first stage in the metamorphosis of insects, and certain other of the lower invertebrates. In insects it is equivalent to the grub or caterpillar stage. Many of the crustacean, as crabs and barnacles, echinoderms, marine worms, and even vertebrate, as frogs, toads, and newts, pass through larval forms. The larval crab was for long described as a distinct crustacean with the name of *Zoëa*. Larvæ are markedly unlike the adult forms of the species to which they belong. See *Metamorphosis*.

Laryngitis is inflammation of the mucous lining of the larynx. The condition is usually associated with inflammation of other parts of the respiratory tract, and appears in acute or chronic form. The chief signs of an acute attack are hoarseness, leading frequently to complete loss of voice, a dry irritating cough, considerable discomfort in the throat, and usually a slight rise of temperature. The chronic form frequently follows an acute attack, but may appear gradually. The three chief factors in its production are mouth breathing, faulty voice-production, and any suppurative in the upper respiratory tract. During an acute attack the patient should be in bed, forbidden to speak, and given inhalations. The attack usually subsides in a week. In chronic laryngitis, along with local treatment, removal of the predisposing cause is essential, then vocal rest, and the use of a lower voice register till all the symptoms have gone.

Laryngoscope, a contrivance for examining the larynx and commencement of the trachea. It consists of a plane mirror introduced into the mouth, and placed at such an angle that the light thrown on it from a concave reflector, in the centre of which is an aperture, is made to illuminate the larynx, the image of which is again reflected through the aperture in the reflector to the eye of the observer.

Larynx, the organ by which the voice is produced, situated at the upper part of the trachea or windpipe. The larynx is formed mainly of two pieces of cartilage, called the *thyroid* (also spelt *thyreoid*) and the *cricoid*, one placed above the other. The thyroid is formed of two ex-

tended wings meeting at the middle line in front in a ridge; above and from the sides two horns project upwards, which are connected by bands to the hyoid bone, from which the larynx is suspended. The thyroid cartilage rests and is movable upon the cricoid, moving backwards or forwards, but not from side to side. The cricoid cartilage is shaped like a signet-ring (Gr. *krikos*,



Larynx

1, As seen from the front. Muscles, with the exception of one crico-thyroid, are cut off short. A, Sternal-hyoid and thyro-hyoid muscles. B, Thyro-hyoid ligaments. C, Thyroid cartilage. D, Cornu major. E, Cornu minor. F, Thyro-hyoid muscle. G, Crico-thyroid muscle. H, Crico-thyroid ligament. J, Cricoid cartilage. K, Trachea. L, Hyoid bone.

2, Section of neck showing larynx. A, Epiglottis. B, Ventricle of larynx. C, Hyoid bone. D, False vocal chord. E, True vocal chord. F, Cricoid cartilage. G, Muscle between arytenoid cartilages. H, Thyro-hyoid membrane. J, Thyroid cartilage. K, Trachea. L, Gullet.

3 and 4, Laryngoscopic views of the superior aperture of the larynx and surrounding parts.

3, The glottis during an easy inhalation of air. N, The base of the tongue. O, Epiglottis. P, False vocal chords. Q, True vocal chords. Between P and S, the ventricle of the larynx.

4, The glottis during the emission of a high note in singing.

a ring), the narrow part of the ring being in front. The cricoid carries, perched on its upper edge behind, the *arytenoid* cartilages, which are of great importance in the production of the voice. These various cartilages form a framework upon which muscles and mucous membranes are disposed. The mucous membrane which lines the larynx is thrown into folds. These folds are called the *true* vocal cords, and by their movements the voice is produced. They are called *true*, as distinct from the *false* vocal cords which are above them, but take no part

in producing the voice. The true vocal cords projecting towards the middle form a chink, which is called the *glottis*. By the contraction of various muscles this chink can be so narrowed that the air forced through it throws the edges of the membrane, in other words, the vocal cords, into vibration and so produces sounds. Variations in the form of the chink will affect changes in the sound. Thus the production of voice is the same as in musical instruments, the arrangements in the larynx being such as (1) to produce the vibratory sounds, (2) to regulate the sound, (3) to vary the pitch, and (4) to determine the quality of the sound. The rapid, delicate, muscular movements involved are produced by nervous stimuli reaching the muscles from the brain. Thus the voice is produced in the larynx, and is modified by the rest of the respiratory passages. (See *Cough*.) In the act of swallowing, the glottis is closed, and the food passes over a cartilaginous plate called the *epiglottis*.

La Salle, René Robert Cavelier, Sieur de, a famous French explorer, born at Rouen 1643, and murdered 1687. He settled in Canada in 1666, but eventually sold his trading-post in order to travel via the Ohio to China. His views gained for his post the derisive title of *La Chine* (q.v.); but he set off, explored the Great Lakes, &c., and returned only to equip another party, with which he reached the mouth of the Mississippi, and formally annexed the surrounding territory as *Louisiana*, after Louis XIV, in whose name he made the proclamation. After many desperate adventures he returned to France, but sailed again in 1684, and landed at Matagorda Bay in the present state of Texas, imagining that he was near the Mississippi mouth. His ships had gone, and he spent two years in searching for the route to Canada, when his followers mutinied and murdered him.

La Salle, a city of the United States, capital of La Salle county, Illinois, on the north bank of the Illinois River, 100 miles south-west of Chicago. It has zinc-smelting works and rolling-mills. There is a good supply of bituminous coal in the neighbourhood. Settled in 1830, La Salle became a city in 1852. Pop. 11,537.

Las Casas, Bartolomé de, a Spanish prelate and missionary, known as the Apostle of the Indians, born at Seville in 1474, died at Madrid in 1566. He accompanied Columbus to Hispaniola in 1498, and on the conquest of Cuba became priest there, and distinguished himself by his humane treatment of the natives. In his zeal for the Indians he returned to Spain several times and obtained decrees in their favour, which, however, were of little avail. In the cause of religion he visited various parts of the New World, including Mexico, Guatemala, and Peru. In 1542 he wrote his famous *Brevísima Relacion*

de la Destruction des Indes. His untiring labours were productive of good to the natives, yet it is a singular fact that he proposed to purchase negroes in order to supply the Cuban planters with African labourers instead of the Indians. He was translated to the bishopric of Chiapas in 1544, but resigned this dignity in 1547 and retired to Valladolid.—Cf. Sir A. Helps, *Life of Las Casas*.

Las Cases (lâs câs), Emmanuel Auguste Dieudonné Marin Joseph, Marquis de, French writer, born in Languedoc in 1766, died at Passy in 1842. Before the Revolution he was a lieutenant of marines, but emigrated to England during the Terror and supported himself by private teaching. Returning to France, he employed himself upon his *Atlas historique*, published under the name of Le Sage. Coming under the notice of Napoleon, he was by him made count and Minister of State, but, by hereditary right, he was a marquis under the old régime. After Waterloo he shared Napoleon's imprisonment in St. Helena, where the emperor dictated part of his *Memoirs* to Las Cases, and took lessons from him in English.

Lasker, Emmanuel, German chess player, born 1808. After defeating Steinitz in 1894, he held the championship of the world till 1920, when he relinquished it in favour of Capablanca. In 1921 he was defeated by Capablanca in a match.

Las Palmas, seaport and capital of Gran Canaria, with a fine harbour at La Luz. It is the finest city in the Canaries, a health-resort, and was the capital until 1833. There is a wireless station (Marconi system) at Melenara, with one long-distance set for communication with Spain, and another with a 250-mile radius for communicating with ships nearby. It is also a coaling-station, and has a fine sixteenth-century cathedral. Pop. (1919), 67,500.

Lassalle (las'sal-le), Ferdinand, a celebrated German Socialist, born at Breslau 11th April, 1825, of Jewish parents, died in 1864. He studied at Berlin University; first made himself known as a leader during the democratic troubles of 1848, and was imprisoned for a year. In 1861 he published his *System of Acquired Rights*. Thereafter he began to organize the working-classes, and was accused by the Government of sedition, when he was imprisoned for four months. In May, 1863, he founded a Labour Union, and began that Socialist propaganda which has since become so wide-spread in Germany. In the summer of 1864 he sought rest in Switzerland, and was there killed in a duel occasioned by a love affair. Although Lassalle's writings had added but little to Marx's theories and teaching, he did a great deal for the labour movement, giving it a powerful impulse. His best-known

treatise is the famous *Programme for the Working Classes*.—BIBLIOGRAPHY: E. Bernstein, *Lassalle as a Social Reformer*; G. Brandes, *Ferdinand Lassalle*; George Meredith, *The Tragic Comedians*.

Lasso, a contrivance used in Latin America, consisting of a long rope of plaited raw hide, at one end of which is a small metal ring. By means of this ring a noose is readily formed, and the lasso is then used for catching wild cattle, the lasso being cast over the animal's head or leg while the hunter is in full gallop. In the United States and elsewhere a hempen rope is favoured. The lariat is a short lasso used for picketing horses.

Latakia, or **Ladiki'a** (anciently *Laodicea ad Mare*), a seaport of Syria, 70 miles north of Tripolis (Lebanon), on the Mediterranean. The harbour is well sheltered, though shallow, and there is a considerable trade in silk and cotton, while Latakia tobacco is famous throughout Europe. Pop. about 20,000.

Lateen Sail is a triangular sail used in xebecs, feluccas, &c., in the Mediterranean, and in the dahabiehs of the Nile. It is extended by a *lateen yard*, which is slung across a mast so as to make an angle of about 45° with it, the lower portion of the yard being about a third of the whole. Vessels rigged in this way are known nautically as *lateeners*.

Lat'eran, one of the churches at Rome, built originally by Constantine the Great, and dedicated to St. John of Lateran. It is the episcopal church of the Pope as Bishop of Rome, and the principal church of Rome. It has a palace and other buildings annexed to it. Every newly elected Pope takes solemn possession of the church, and from its balcony the Pope bestows his blessing on the people. The site on which the buildings of the Lateran stand originally belonged to Plautius *Lateranus*, who was beheaded by Nero (A.D. 66): hence the name. The palace of the Lateran was the residence of the Popes from the fourth century until their migration to Avignon. After their return to Rome the Popes removed to the Vatican. The modern palace of the Lateran contains two museums, the *Museo Profano* and the *Museo Cristiano*.—Cf. A. J. C. Hare, *Walks in Rome*.

Lateran Councils, councils of the Roman Catholic Church, so called because they were held in the Lateran Church in Rome. There were eleven such councils, five of which were œcumenical, the most important being that convened by Alexander III, 2nd March, 1179, which established the form under which the Popes are elected, and that called by Innocent III in Nov., 1215, which ordered the Crusade, condemned the Waldenses, and declared transubstantiation to be a doctrine of the Church.

Laterite (Lat. *luter*, a brick), a hard rubbly

crust on rocks of various natures, produced by their alteration under the alternations of sunshine and ruin in tropical climates. Aluminium silicates and iron compounds become broken up, silica being removed in solution; the residual laterite consists very largely of aluminium hydroxide stained by iron rust. The name was first given to altered basalt in India, and laterite has since been studied in Madagascar, Central Africa, and many tropical lands, and in the red zones among the basaltic lavas of early Cainozoic age in the north of Ireland.

Latex, a milky juice exuded by certain plants when wounded. It is contained in special latex-tubes, which usually form a meshwork of intercommunicating vessels, as in Compositæ and Papaveraceæ, but sometimes represent separate enormously elongated and branched cernocytes, as in Euphorbiaceæ. Latex is usually white, but may be yellow (*Chelidonium*) or red (*Sanguinaria*). Its components are varied, and include nutritive substances (oil, protein, starch), alkaloids, india-rubber, &c. As latex coagulates on exposure to air, and usually contains poisonous or bitter ingredients, its principal functions are probably protection and the healing of wounds.

Lathe. See *Machine Tools*.

Lathyrus, a large genus of elegant plants, natives of the northern hemisphere and of South America, nat. ord. Leguminosæ. Many are ornamental, such as the sweet-pea (*L. odoratus*) and the everlasting-pea (*L. latifolius*), and some useful as agricultural plants.

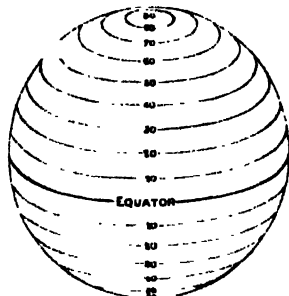
Latimer, Hugh, an English prelate, reformer, and martyr, born about 1485 at Thurcaston, near Leicester, died in 1555. He entered Cambridge University about 1505, and became M.A. in 1514. He took holy orders, and preached the Protestant dogma, in which he was vigorously opposed. He was made chaplain to Henry VIII in 1530, and during the ascendancy of Anne Boleyn in 1535 he was translated to the bishopric of Worcester. In 1539 he resigned his bishopric to avoid acceptance of the Six Articles, and was imprisoned, but on the accession of Edward VI he was released and became highly popular at court. Upon the accession of Mary, Latimer was cited to appear, with Cranmer and Ridley, before a council at Oxford, and condemned. After much delay and a second trial Latimer and Ridley were burned at the stake, 10th Oct., 1555. His preaching was popular in his own time for its pith, simplicity, and quaintness.

Latins (*Latini*), the ancient inhabitants of Latium, in Italy. In very early times the Latins formed a league of thirty cities, of which the town of Alba Longa, said to have been built by Ascanius, the son of Æneas, became the head. Rome was originally a colony of Alba, and thus

the language of the Romans is known as the Latin language.

Latin Union, a monetary convention instituted in 1865, between France, Italy, Belgium, and Switzerland, for an identical coinage (though not as regards the actual stamping), which was to be recognized as legal tender in the territory of each of the parties; in 1868 it was also joined by Greece. See *Bimetallism*.

Latitude, one of the co-ordinates used to specify the position of a point on a sphere. *Celestial latitude* is the angular distance of a heavenly body from the ecliptic. *Geographical latitude* is the angular distance of a place on the earth's surface from the equator, measured along the meridian of the place (in degrees, minutes, and seconds). The latitude is therefore equal to the altitude of the pole, which may be found indirectly from observations of a circumpolar star. The usual method of determining latitude at sea is to observe the meridian altitude of the sun. Greenwich time is known from the chronometer or by wireless, so that the declination of the



Parallels of Latitude

sun can be found from the nautical almanac. From the sun's declination and meridian altitude the latitude is found by a simple addition or subtraction. Places near the equator are said to be in *low* latitudes, those near the pole in *high* latitudes. *Parallels of latitude* are imaginary circles drawn upon the earth, parallel to the equator. The length of a degree of latitude is variable, on account of the earth's deviation from perfect sphericity; near the equator a degree is 68·7 miles, near the poles 69·4 miles. See *Surveying*.

Latitudinarians, a term applied to certain English divines of Charles II's time, who endeavoured to allay the contests that prevailed between the Episcopalians and the conjoint Presbyterians and Independents, and also between the Arminians and Calvinists. At present the term generally denotes one who commends or sanctions deviations from the strict principles of orthodoxy.

Latium, the ancient name applied to a district of Central Italy on the Tyrrhenian Sea, extending between Etruria and Campania, and inhabited by the Latini, Volsci, and Æqui.

Latona (by the Greeks called *Λατώ*), in Greek mythology, the mother of Apollo and Artemis.

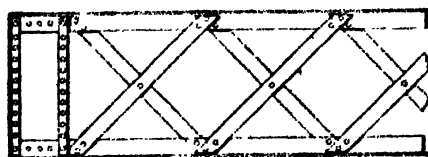
She was worshipped chiefly in Lycia, Delos, Athens, and other cities of Greece.

Latour d'Auvergne, Théophile Malo Corret de, French soldier, born at Carhaix, Brittany, 1743, died 1800. He enlisted in 1767, and became aide-de-camp to the duc de Crillon, distinguishing himself at Mahon in 1782. In the early days of the Revolution he was captain of grenadiers, but steadily refused promotion. His intrepidity and his Spartan-like existence, no less than his inherent modesty, became traditional throughout the French armies, and Carnot obtained from Napoleon, then First Consul, a decree constituting Latour d'Auvergne *First Grenadier of France*. He was killed at Oberhausen, in Bavaria, but his spirit lives to-day, and on ceremonial occasions his name is called from the muster-roll of his regiment (46th), the senior sergeant returning the thrilling response *mort au champ d'honneur*. His remains were carried to the Panthéon and interred, 4th Aug., 1889.

La Trappe, a Cistercian abbey of Northern France, situated in a narrow valley of Normandy, 20 miles north-east of Alençon. Founded in 1140, it had become in the sixteenth century a haunt of licentious monks known as 'the bandits of La Trappe'. In the seventeenth century, however, the abbot Armand Jean le Bouthillier de Rancé instituted a vigorous reform, and caused the monks to adopt a life of severe asceticism. The austere Trappists passed their time in devotions, meditation, and labour, spoke no word to each other except the salutation of *Memento mori*, fed upon fruit and vegetables, and were entirely cut off from the world. At the Revolution the Trappists were obliged to leave France, but afterwards returned, though expulsions took place again in 1830. They have a few houses in Germany, two in England, two in Ireland, and several in America. The Trappists wear a dark-coloured frock, cloak, and cap, which covers the whole face. Their discipline is much as before—they go to bed at seven or eight, rise at two, and maintain constant silence.

Latter-day Saints. See *Mormons*.

Lattice-girder, a girder, used largely in



Lattice-girder

bridge construction, in which the web is made up of mild-steel flat-bars or angle-irons riveted to the flanges and to each other, to form a system

of diagonal bracing or lattice-work. Half of the bracings act as tension members and half as compression members. The girder rests on the pier at one end, and is provided with steel expansion rollers at the other. Other braced girders of similar character are the Warren, in which the web bracings take the form of equilateral triangles, and the Murphy-Whipple or Pratt, where they are in right-angled triangles.

Lattice-leaf, or **Lattice-plant**, a very remarkable aquatic plant of Madagascar (*Ouvirandra fenestrâlis*), by some referred to the nat. ord. Juncaginaceæ, by others to the Naiadaceæ, and noteworthy for the structure of its leaves. The blade resembles lattice-work or open needle-work, the longitudinal ribs being crossed by cross-bars, and the interstices between them open.

Latvia, an independent republic created 18th Nov., 1918. Before the outbreak of the Russian Revolution (1917) it formed part of the Russian Empire. The country consists of the former Russian province of Courland (10,435 sq. miles), of Latgallia, or three districts of the province of Vitebsk (5292 sq. miles), and of the southern portion of Livonia (Riga, Wenden, Wolmar, and Walk, 8715 sq. miles). Latvia, inhabited by the Letts (q.v.), is an agricultural country, the soil being fertile and highly cultivated. The industries, which are being gradually developed, include textiles, chemicals, and spirits. The exports are dairy-products, timber, and flax. The majority of the population is Protestant, but there are nearly 200,000 Greek-Orthodox, and many Roman Catholics, especially in Latgallia. Jews form 4.29 per cent of the entire population. A national Latvian University was established at Riga in 1919. The Latvian Constituent Assembly, consisting of 152 members, met on 1st May, 1920, but in 1922 the Constitution had not yet been elaborated. Area, about 25,000 sq. miles; pop. (1920), 1,503,190.

History.—Latvia, the land of the Letts, was invaded by the Germans in the thirteenth century, and the Teutonic Order created a state (a Federal Republic consisting of Esthonia, Livonia, Courland, and Latgallia) which lasted until 1500. Parts of the country were subsequently annexed by Sweden, Lithuania-Poland, and Denmark, Courland alone retaining its independence. After the partition of Poland (1772) Latgallia became Russian, and Courland lost its independence in 1795. Henceforth Latvia remained under Russian rule till 1917. After the Russian Revolution (1917) the Letts, like so many other nationalities, demanded independence and the formation of an autonomous Latvia. A National Lettish Council was organized, and on 18th Nov., 1918, the sovereign free state of Latvia was proclaimed. For nearly two years, however (till Aug., 1920),

the Letts had to fight against the troops of the Soviet Government and the Germans. The independence of the country was formally recognized by the Supreme Council on 20th Jan., 1921.

Lauban, a town of Prussia, in Silesia, on the Queiss. It has manufactures of woollen and linen cloth and tobacco. There is a fourteenth-century convent of the Magdalens. Pop. 15,400.

Laud, William, Archbishop of Canterbury, born at Reading 1573, and beheaded on Tower Hill, London, 10th Jan., 1645. He was the son of a clothier, and received an elementary education at Reading, matriculating at St. John's College, Oxford, in 1589, and subsequently winning a scholarship there. In 1593 he was admitted a Fellow of his college, and in 1608 became D.D. At St. John's he studied under John Buckeridge, an Elizabethan ecclesiastical reformer, whose teachings influenced him in after life. Laud was chaplain to Neile, Bishop of Rochester, in 1608, and king's chaplain, accompanying James I to Scotland in 1617. On the accession of Charles I he was nominated Bishop of Bath and Wells, and was translated to London in 1628. In 1630 he was elected chancellor of the University of Oxford, which he enriched with a valuable collection of manuscripts, establishing also a professorship of Arabic, and, although he received two offers of a cardinal's hat, he eventually accepted the office of Archbishop of Canterbury, and was enthroned in 1633. Prior to this appointment Laud's influence upon ecclesiastical matters in general had only been felt indirectly through his position upon the High Commission and in the Court of Star Chamber, but now he was enabled to adopt as an ideal the principles of Buckeridge, and he had no scruples in utilizing all his political and ecclesiastical influence to root out Calvinism and Roman Catholicism and establish the Episcopacy. Eventually he was impeached by the Long Parliament (1640), and appeared at the bar of the House of Lords, being committed thereafter to the Tower for high treason. After three years he was brought to trial, but the House of Commons passed a Bill of Attainder (4th Jan., 1645) declaring him guilty of high treason, and condemned him to death. Laud's *Diary* was published by Wharton in 1694.—BIBLIOGRAPHY: Peter Bayne, *Chief Actors in the Puritan Revolution*; A. C. Benson, *Archbishop Laud: a Study*; W. L. Mackintosh, *Life of William Laud*.

Lauder, Sir Harry MacLennan, Scots vocalist and character comedian, born 1870 (Portobello); was successively mill-boy, miner, amateur vocalist, and eventually made a hit at the London Pavilion. He took the theatrical public by storm, toured the United States, and reached the top of his profession. During the European

War he raised a Million-pound Relief Fund, diffused Scottish patriotism in the United States by song and story, and was knighted in 1919. He wrote a book of war experiences entitled *A Minstrel in France*.

Lauderdale, John Maitland, first Duke of, born at Lethington, in Scotland, 24th May, 1616, died 24th Aug., 1682. He entered public life as a zealous Presbyterian; was one of a Scottish deputation who waited on Charles I for the purpose of urging upon him the adoption of moderate views; sat in the Westminster Assembly of Divines in 1643; and not long afterwards was a party to the delivery of the king to the English army at Newcastle. Stricken by remorse, he became converted to the Royalist cause, and secretly undertook to raise a Royalist army, which he unsuccessfully sought the Prince of Wales, afterwards Charles II, to command. When at last, in 1650, Charles II embarked for Scotland, he was accompanied by Lauderdale who was taken prisoner at the battle of Worcester (1651), and was not set at liberty till the Restoration in 1660, when he joined the king at Breda, and was made Secretary of State for Scotland. His power he used with unscrupulous rigour in his efforts to force Episcopacy upon his former Presbyterian friends. As a reward for his zeal and subserviency he was created Duke of Lauderdale and Marquess of March (1672), and raised to the English peerage as Earl of Guildford and Baron Petersham (1674), being afterwards one of the junta known as the Cabal. As a result of the tyrannical conduct which made his name the most hated and feared in all Scotland, an address was presented to the House of Commons praying that he might be removed from all his offices. Charles was forced eventually to remove him, and his resignation was accepted in Oct., 1680. In Aug., 1682, Lauderdale died and the dukedom became extinct. A selection from his manuscripts was edited by Osmond Airy, in four volumes, in 1883-5.

Laughing-gas, Nitrous Oxide, or Nitrogen Monoxide, N_2O ; called *laughing-gas* because when inhaled in small quantity it causes hysterical laughter. It is a colourless gas with slightly sweet odour, and resembles oxygen in some of its properties. Its physical constants are almost identical with those of carbon dioxide, a fact of some interest in connection with Langmuir's theory of molecular structure. The substance is prepared by heating ammonium nitrate, which decomposes readily, yielding nitrous oxide, $NH_4NO_3 \rightleftharpoons N_2O + 2H_2O$. Nitrous oxide, the 'gas' of the dentist, acts as an anæsthetic, either when inhaled pure or mixed with one volume of oxygen, and is used in minor operations. If the gas is to be used for this purpose, it is carefully purified from other oxides of nitrogen,

dried, and liquefied by pressure and cooling, and stored in iron bottles.

Laughing Jackass, or **Giant Kingfisher** (*Dactilo gigas*), a bird allied to the kingfisher, deriving its former title from the singularly strange character of its cry. It is an inhabitant of Australia, being found chiefly in the south-



Laughing Jackass (*Dactilo gigas*)

eastern portion of that country. It makes no nest, but deposits its eggs in the decayed hollow of a gum tree. In length about 18 inches, it has a dark-brown crest, its back and upper surface is olive-brown, wings brown-black, and the breast and under portions white, crossed by faint bars of pale brown. The tail is longish, with a rounded extremity, tipped with white; its colour is a rich chestnut, with deep black bars.

Laughter. Among the philosophers who have endeavoured to explain the causes of laughter are Aristotle (*De Poetica*), Cicero (*De Oratore*), Hobbes (*Human Nature*), who defines the cause of laughter "to be a sudden glory, arising from a sudden conception of some eminency in ourselves by comparison with the infirmity of others", Shaftesbury, Darwin, Spencer, Bergson, and others. Bergson thinks that mirth is the result of a contrast between the stiffness of a mechanism and the suppleness of life. We laugh at a man who slips and falls, because in falling he obeys mechanical laws, whilst we expect him to be agile enough to keep his feet. Some authorities are of opinion that 'disappointed expectation' is enough to provoke laughter.—**BIBLIOGRAPHY:** Herbert Spencer, *The Physiology of Laughter* (Essays: Scientific, Political, and Speculative); James Sully, *An Essay on Laughter*; H. L. Bergson, *Laughter*; L. Dugas, *Psychologie du rire*.

Launce, a name common to two species of fishes, otherwise called sand-eels. They have

their name from their lance-like form. See *Sand-eel*.

Launceston (lans'ton), a town of England, county of Cornwall. The Prince of Wales as Duke of Cornwall receives homage on the castle mound of Launceston, and the town itself pays to him a pound of pepper. Pop. 3981.

Launceston, the second town of Tasmania, by rail 120 miles north of Hobart, at the confluence of the North and South Esk Rivers with the Tamar, which is navigable up to the town from the sea at Port Dalrymple, a distance of 40 miles. Pop. 23,726.

Lauraceæ, the laurel family, a natural order of apetalous dicotyledons, consisting entirely of trees and shrubs inhabiting the warmer parts of the world, and in most cases aromatic. Cinnamon, cassia, sassafras, and camphor are products of the order. The best-known species is the *Laurus nobilis*, laurel or sweet-bay.

Lau'reate, Poet, a designation first applied to poets who were honoured by the gift of a laurel wreath. It is now the name of an official nominally connected with the royal household of Great Britain, appointed by patent, first granted by Charles II in 1670. The appellation is derived from Lat. *laurus*, a laurel, in allusion to the ancient practice of crowning poets with a laurel wreath. The custom, which existed among the Greeks, was revived in the Middle Ages, and Petrarch was crowned at Rome in 1311. At the Universities of Paris, Oxford, and Cambridge distinguished graduates were presented with a laurel wreath, and were in consequence styled *Porta Laureate*. The royal Laureate was merely one of these in the king's service. They were, however, not crowned, and instead of this honour they received pensions. Such stipendiary royal poets were Chaucer, Gower, Skelton, Robert Whittington, Spenser, and Samuel Daniel. Ben Jonson, who received a pension in 1616 and 1630, came to be regarded as Laureate, but the title, as it seems, was never officially conferred on him. The first English poet who received the title of Poet Laureate by royal letters patent was John Dryden, on 18th Aug., 1670. At one time the Laureate used to furnish an ode on the birthday of the king or upon the occasion of a national victory, the emoluments of the office being £100 a year with a tierce of canary. Since the reign of George III there have been no special duties connected with the office, which now has a yearly allowance of £72 attached to it. From the time of Charles II the following poets have held the office of Laureate: John Dryden, Thomas Shadwell, Nahum Tate, Nicholas Rowe, Lawrence Eusden, Colley Cibber, William Whitehead, Thomas Warton, Henry James Pye, Robert Southey, William Wordsworth, Lord Tennyson, Alfred Austin, and Robert Bridges.—*Cf.* W. F.

Gray, *The Poets Laureate of England: their History and their Odes*.

Laurel, a plant belonging to the genus *Laurus*, nat. ord. Lauraceæ, to which it gives the name. The sweet-bay or laurel (*Laurus nobilis*) is a native of the north of Africa and south of Europe, and is cultivated in gardens not only on account of its graceful appearance, but also for the aromatic fragrance of its evergreen leaves. The fruit, which is of a purple colour, and also the leaves, have long been used in medicine as stimulants and carminatives. The common or cherry laurel is *Cerāsus laurocerānus*, the Portuguese laurel *Cerāsus luxitanica*, the spurge-laurel *Daphne Laureola*, but these are very different from the true laurel. In ancient times heroes and scholars were crowned with wreaths of bay leaves, whence the terms *laurels* in sense of honours (and similarly *bays*), and *laureate*. From the fruit of the sweet-bay or laurel several oily substances have been extracted. Thus there is the *oil of laurel*, a yellowish oil with an odour of laurel and a strong bitter taste; *laurel fat*, a yellowish-green buttery substance, used for embrocations in rheumatism, paralysis, deafness, &c. Water distilled from the leaves of the cherry-laurel (*laurel-water*) contains prussic acid, and is used medicinally.

Laurentian, in geology, a term applied to a vast and very ancient series of stratified and crystalline rocks, including gneiss, mica-schist, quartzite, serpentine, and limestone, found in the Laurentian Plateau of Canada. The granites and gneisses originally styled Laurentian are now known to be intrusive in rocks of still earlier date, and the name is likely to fall into disuse; the term *Archean* is now generally given to the older members of the pre-Cambrian group, and by many authors to the whole group. See *Geology*.

Laurentian Plateau, a great physiographical region in Canada, comprising an old mountain mass, considerably affected by weathering, and now about 1500 feet in mean elevation. It extends as a vast sweeping crescent round Hudson Bay.

Laurier, Sir Wilfrid, Canadian statesman, born of French Roman Catholic parents at St. Lin, Quebec, 20th Nov., 1841, died at Ottawa 17th Feb., 1919. Educated at McGill University, Montreal, he was called to the Bar in 1864, and seven years later entered the Provincial Assembly. In 1874 he became a member of the Federal Assembly, in 1877 Minister of Inland Revenue, and in 1891 leader of the Liberal party. In 1896 he became Premier of Canada, being the first French-Canadian or Roman Catholic to hold that post. He represented Canada at the Colonial Trade Conference in London in 1902, and at Imperial Conferences in 1907 and 1911.

In this year his Government advocated a measure of trade reciprocity with the United States, but was defeated, and resigned office. He was made a Privy Councillor in 1897, and a G.C.M.G. At the outbreak of the European War he supported the parliamentary vote in aid of the mother-country. In 1917 he opposed compulsory service, and during the conscription controversy was deserted by many of his followers.—(Cf. O. D. Skelton, *The Day of Sir W. Laurier*.)

Laurustine, or **Laurustinus** (*Viburnum tinus*), a favourite evergreen shrub belonging to the south of Europe, and grown in Britain. Its flowering season is from December to April.

Laurvik, a seaport town and spa of Norway, on a small fjord entering from the Skagerrak, at the mouth of the Lauven, 67 miles s.s.w. of Christiania. Pop. 10,105.

Lausanne, a town of Switzerland, capital of the canton of Vaud, and a noted tourist centre. It is built on three hills, and is divided into two parts by the Flon Valley. A bridge, the *Grand Pont*, spans this valley and links up the *Cité* on one side with the *Bourg* on the other. The town is overshadowed by its cathedral (Notre Dame), which dates from 1235, a Gothic erection last restored in 1900, and reputed to be the finest mediæval building in Switzerland. A university has occupied the Palais de Rumine since 1906. Gibbon lived at Lausanne, and here he wrote the greater part of the *Decline and Fall of the Roman Empire*. Pop. (1920), 67,858.

Lava, a general term for all rock-matter that flows, or has flowed, in a molten state from volcanoes, and which, when cooled down, forms varieties of igneous rock, the structure of which is influenced by slowness or rapidity of cooling, while the minerals that separate out depend mainly on the chemical composition of the mass (see *Igneous Rocks*). Lavas are often scoriaceous, through the escape of gases from the viscous mass. A *contemporaneous lava bed* is one which has been poured out over the surface of one deposit, and covered by subsequent deposits. The portion of the lava that has cooled in the volcanic vent, or in a dyke, without reaching the surface must be classed as *intrusive*, and connects the flows with the material that occupies the subterranean cauldrons.

Laval, a city of France, capital of Mayenne, on the River Mayenne. The twelfth-century Cathedral of the Trinity, the ducal château, and the ancient city gates are prominent features. Damasks and other linen goods, flannel, paper, leather, flour, dye-stuffs, and machinery are manufactured. The linen industry was introduced into Laval in the fourteenth century. Pop. 30,000.

Lava'tsa, Johann Kaspar, celebrated as a physiognomist, was born 1741 at Zürich, in

Switzerland, and died 1801. He first appealed to the public as a poet in 1767, and then became pastor of a Zürich church (1774). Lavater is best known, however, as the originator of a system which, when applied to the lines and contours of the face, he claimed to be able to read the character of its owner. He adopted the idea in 1769, and published his great work under the title of *Physiognomical Fragments* (4 vols., 1775-8).

Lavaur (là-vör), a town of France, department of Tarn, 23 miles south-west of Albi. Its castle was stormed in 1211 by Simon de Montfort, and the refugee Albigenses were massacred. Pop. 6100. See *Albigenses*.

Laveleye (lav-lä), Emile Louis Victor, Baron de, a Belgian political economist, born 1822, died in 1892. He was educated at Bruges and Paris; published his first work in 1847, and became professor of economics at the University of Liège in 1864. He published many works on the science of economics, of which we may mention: *Étude d'économie rurale* (1864), *Éléments d'économie politique* (1882), and *Le Socialisme contemporain*.

Lavender (*Lavandula vera*), a delightfully fragrant shrub 3 to 4 feet high, nat. ord. Labiata, a native of the south of Europe. Under favourable conditions it contains one-fourth of its own weight in camphor. It also produces a volatile oil, which is much in demand as an excellent perfume. This oil is got by distilling the flowers. It has a pale-yellow colour, aromatic odour, and a hot taste. Besides being employed as a perfume, it is used in medicine as a stimulant in hysteria, colic, and other ailments. *Spirit of Lavender* is prepared by digesting the fresh flowers in rectified spirits and distilling. *Lavender-water* is a solution of oil of lavender in spirit along with otto of roses, bergamot, musk, cloves, rosemary, &c. This preparation, after standing for some time, is strained and mixed with a certain proportion of distilled water.

Laver, a name given to two species of Algae of the genus *Porphyra*—*P. laciniata* and *P. vulgaris*. They are employed as food, salted, eaten with pepper, vinegar, and oil; and are said to be useful in scrofulous troubles and glandular tumours.—*Green laver* is the *Ulva latissima*. It also is employed as food, stewed and seasoned with lemon-juice, and is ordered for scrofulous patients.

Lavoisier (là-vwä-si-ä), Antoine Laurent, French chemist, was born at Paris 26th Aug., 1743, died 1794. He was educated at the Collège Mazarin, studying mathematics and astronomy under Lacaille. He published several treatises, travelled through France collecting material for a geological chart, became an associate of the Academy in 1768, and obtained the post of

Farmer-General of Taxes in 1769. His wealth and position enabled him to extend his researches, and the new discoveries of Priestley, Black, and Cavendish gave impetus and direction to his studies. In 1790 he sat on the Commission of Weights and Measures, and in 1791 became Commissary to the Treasury. In 1794 Lavoisier was accused before the Convention as an ex-Farmer-General and guillotined. He was the first to organize the methods of chemistry and establish its terminology. His most important discoveries are to be found in his *Traité de Chimie* and *Mémoires de Physique et de Chimie*.—**BIBLIOGRAPHY**: E. Grimaux, *Lavoisier d'après sa correspondance, ses manuscrits, ses papiers de famille et d'autres documents inédits*; M. P. E. Berthelot, *La Révolution chimique: Lavoisier, &c.*

Law, Andrew Bonar, British politician and party leader, was born in 1858 in New Brunswick, the son of a Presbyterian clergyman. Educated in Canada, Hamilton, and at Glasgow High School, he entered the iron trade, and was in business until 1900, when he entered the House of Commons as Unionist member for Blackfriars, Glasgow. In 1902 he was Parliamentary Secretary to the Board of Trade, but lost his seat to G. N. Barnes (Labour) in 1906. He was subsequently returned for Dulwich, and, on resigning his seat to contest North-West Manchester, where he was defeated (1910), he successfully contested Bolton, Lancashire, in 1911. On the resignation of Mr. A. J. Balfour he became Leader of the Opposition until 1915, when he was appointed Colonial Secretary. On the resignation of Mr. Asquith in 1916, Bonar Law declined to form a Cabinet, and joined Mr. Lloyd George as a Coalition Unionist. He accepted office under the Coalition, and was both Chancellor of the Exchequer and Leader of the House of Commons, a post specially created for him, until 1918. He sat in the War Cabinet from 1916 until 1919, and in the general election of 1918 he was returned as Coalition Unionist for the Central Division, Glasgow, and appointed Lord Privy Seal and Leader of the House. He was British Plenipotentiary at the Versailles Conference. In 1921 he resigned office, but retained his seat in Parliament. As a coronation honour he was made Privy Counsellor in 1911. He died on 30th October, 1923.

Law, John, of Lauriston, a celebrated Scottish financier, son of a goldsmith of Edinburgh, born 1671, died at Venice 1729. He was bred to no profession, but being skilled in accounts he made various proposals to the Scottish Parliament to remedy the currency, which were rejected. Subsequently he fled from his country in consequence of a duel; visited Genoa and Venice, where he accumulated a fortune by gambling; settled in France, where he received royal patronage, and

there started a private bank, and floated his celebrated Mississippi Company. His immediate success was so great that he was made a Councillor of State and Comptroller-General, but the large amount of paper money issued depreciated the shares, and led to the collapse of his schemes. Having had to flee from France, he wandered about Europe as a gambler, and died at Venice in poverty. A volume entitled *Œuvres de J. Law* was published at Paris in 1700, and reprinted in 1843. — Cf. A. W. Wiston-Glynn, *John Law of Lauriston*.

Law, Constitutional. The province of Constitutional Law, stated in general terms, is to define the powers and functions of the several bodies entrusted by a state with the making of laws, the enforcement of laws, and the interpretation of laws, to regulate the relations of these several organs to one another, to the machinery of local government, and to the individual subjects of the state. It determines such matters as succession to the throne; the royal prerogatives; the qualification for membership, privileges, and powers of the Houses of Parliament; the function of ministers; the organization of the administrative departments, and of the courts of justice; the jurisdictions of these courts, original or appellate; the powers of local governing bodies; the relations between the mother country and its dominions and colonies; the rights of the state against its subjects; and the protection and remedies which the subjects may claim from the state, in the exercise of private rights of person and property.

The Constitution of a state thus consists of two parts: (a) the institutions which exercise the three chief functions of government, legislative, executive, and judicial; and (b) the rules or laws which regulate the mode in which each of these should exercise its powers, independently, in relation to the other organs of government, and to the individual subjects. These relations and rules may definitely be laid down in a written document as in the case of the United States and France. In Great Britain the Constitution has not been so reduced to a code, but has come into being piecemeal so as to meet practical necessities as they arose. The rights of individuals in this country are not as in some Continental countries explicitly guaranteed, but have been established gradually as the result of judicial decisions in particular cases. The constitutional law of our country is thus heterogeneous in character, consisting in part of statutes like Magna Charta, 1215, the Bill of Rights, 1689, and the Parliament Act, 1911, partly of customary law, and partly of judicial precedents. Alongside of these constitutional laws have grown up a number of conventions or understandings which have not the force of laws but which are an in-

tegral and vital part of our Constitution, giving to it much of its distinctive character. These conventions regulate such matters as the position and formation of a Cabinet, the occasions when it is proper that a Ministry should retire, the precise political functions of the Crown, and obviously discharge a very useful function in reconciling the conflicts between different parts of the constitutional machinery in circumstances which could hardly come within the scope of or be regulated by proper laws.

The relations between the legislature and executive and the judiciary are different under different constitutions, but in England the legislature is the ultimate source of power in the state.* Parliament (consisting of King, Lords, and Commons) has absolute legal sovereignty in virtue of which it alone may pass, alter, or repeal any law. Parliament is superior to the judiciary, which cannot by any decision overturn but can only interpret and apply the law as declared by Parliament. Parliament has also control over the executive, for ministers are accountable to the legislature and can only continue in office so long as they command the confidence of the legislature.

In these respects the British Parliament offers a strong contrast to Congress in the United States. In the United States the relations of legislature, executive, and judiciary are regulated by the principle of the 'separation of powers'. Congress has no control over the ministry, which can continue in office for its appointed term whether it enjoys the confidence of the legislature or not. Further, Congress does not possess legislative sovereignty; the scope of the measures it may pass is strictly defined in the Constitution, and any statutes contrary to the fundamentals of the Constitution may be overturned as null and void by the Supreme Court of Judicature. The judiciary is thus placed in an independent and paramount position so as to safeguard the written Constitution from innovation and change. The doctrine of the separation of powers may thus develop considerable friction between the different organs of government, while the rigidity of the written Constitution, changeable not by the legislature but only by a cumbrous machinery, may prevent or at least retard reforms which are approved by the people.

In Britain, however, by means of the Cabinet system, a device which has imperceptibly and without enactment come into being, a link has been created between the executive and the legislature, for the members of the Cabinet are at once the king's ministers and members of either House of Parliament, being selected from the party which commands a majority in the House of Commons. The electorate thus exercise

through their representatives in Parliament a control over the policy of the ministry, and over the programme of legislative measures which the ministry introduce into Parliament. Again, because of the absence of that rigidity which is inevitable in a written Constitution, the British Constitution is more responsive to the demand of the electorate for change and reform. No special machinery requires to be set in motion, no fundamental law forbids legislation in any special direction, only the demands of the electorate need be considered. Parliament can make and it can also unmake any law. It is for the time being invested with omnipotence, unrestricted by the provisions of previous statutes or by the most firmly established rules of common law, unfettered by judicial precedents or the will of the executive.

Another feature of our Constitution is described by Professor Dicey as the Rule of Law. The same law applies to all alike. There are thus no legal privileges enjoyed by any social class, and only very limited immunities extended to officers. In some countries there are special rules which apply only to officials, and special administrative tribunals, with a more or less official composition, decide questions in which officials are involved. But with us all officials, military and civil, are answerable for their actions to the ordinary courts and to the ordinary law, and in a question with a civilian who has suffered injury are answerable both civilly and criminally. They cannot plead reasons of state or the commands of a superior as justification for committing a wrong. Respect for individual freedom and private rights is thus the basic principle of our Constitution, which is prohibitive in its provision of remedies for the infringement and invasion of the right of the subject to freedom of speech, the exercise of his calling, the use of his property and his personal liberty.

Law, Courts of. Justice in England is administered by a series of courts, central and local, all graded with reference to the importance of the classes of cases with which they deal.

Central Courts.—The historic Courts of Common Law, viz. Common Pleas, King's Bench, and Exchequer, all arose by a process of devolution from the *Curia Regis* or King's Court. To begin with, the *Curia Regis* of the Norman kings was concerned with matters directly affecting the royal interests and the determination of disputes between the greater subjects. For the great mass of the people justice was administered and law enforced by means of the old popular courts of *shire* and *hundred* which had existed in England prior to the Norman Conquest, and in the baronial courts of the feudal overlords. The popular and feudal courts were only gradually brought into relation with

the royal courts. Step by step the King acquired an effective supervision of the local courts which was achieved by the appointment in each shire of a royal representative known as the *sheriff*, and by the practice of sending out from his *Curia Regis* itinerant justices who made periodical circuits of the shires, and by the writ system which enabled the royal courts to take cognizance of suits which were pending or had hitherto usually been brought before the local courts. By these means royal justice became co-extensive with national justice, and the royal courts, instead of being primarily reserved for the decision of matters affecting the king and his greater subjects, was now made available to all subjects as a court of first instance or by way of appeal. The increased competency of the *Curia Regis*, and the increasing mass and varied character of the business with which it was called upon to deal, necessitated in time a systematic division of its work into departments, and the devolution of particular classes of cases on separate bodies of judges. Hence arose ultimately a series of distinct courts, all offshoots from the parent body of the *Curia Regis*, and all having theoretically at least a more or less prescribed sphere of jurisdiction. The first of these courts to become definitely marked off was the Court of Common Pleas, which may be traced to the reign of Henry II, and the province of which was to decide between subject and subject in cases where the royal interests were not directly affected. Finally there existed side by side three such courts:

1. Court of Exchequer, dealing with fiscal matters.

2. Court of Common Pleas, deciding disputes between subject and subject.

3. Court of King's Bench, dealing with pleas of the Crown, including crimes which had now come to be conceived of as an injury to the state and not merely as in primitive times to the individual affected.

These courts of justice dispensed *Common Law*, which came to be highly technical, narrow, and stereotyped in its procedure. In many cases its provisions pressed harshly on litigants, or failed to provide a remedy, and so petitions were frequently made to the King to mitigate the harshness or supply the deficiencies of the Common Law. These petitions were generally referred to the Chancellor, the 'keeper of the king's conscience'. Hence grew up a new court, the Court of Chancery, dispensing justice according to rules of equity, a system compounded of notions of moral right and common sense, and claiming to override in particular cases the rigid technical rules of the Common Law. The history of English law for centuries is in great measure the history of the conflict of the three Courts of

Common Law, each seeking by means of legal fictions to increase its jurisdiction and to attract business at the expense of the others; and of the resistance of the Courts of Common Law as a whole to similar encroachments on the part of the Court of Chancery. Thus the Exchequer, by means of the Writ *Quominus*, enabled a plaintiff in a suit between subject and subject to make a fictitious averment that he was the 'king's debtor', and was prevented from paying the King because of the defendant's default. Again, the Court of King's Bench, which had an original jurisdiction in trespass *vi et armis* in Middlesex, similarly poached on the sphere of Common Pleas by the issue of the Writ *Latitat*, which enabled a plaintiff, by a fictitious averment that the defendant had committed such a trespass, to bring a civil action of debt in the King's Bench. Again, by means of injunctions and subpoenas, the Court of Chancery could stay proceedings or nullify the effects of judgment in the Courts of Common Law. Thus it came about that the three Courts of Common Law, King's Bench, Exchequer, and Common Pleas, originally distinct, came to exercise a virtually concurrent jurisdiction where Common Law gave adequate relief. This state of matters, which gave rise to many anomalies and abuses, only came to an end with the Judicature Act of 1873. This Act, as amended by the Act of 1875, produced far-reaching reforms of machinery and procedure, and at the same time, if it did not 'fuse law and equity', did much to remove the difference between the two systems and the inconvenience to litigants. The eight superior courts of record - King's Bench, Common Pleas, Exchequer, Chancery, Probate, Divorce, Admiralty, and Bankruptcy - were merged into one great court called the Supreme Court of Judicature, which has two branches, (1) the High Court of Justice, which is a court of first instance as well as a Court of Appeal from inferior courts, and (2) the Court of Appeal, which is a court of intermediate appeal, there being a final appeal from its decisions to the House of Lords.

The High Court of Justice has now three Divisions:

1. The *King's Bench Division* (incorporating since 1881 the older Divisions of King's Bench, Common Pleas, and Exchequer), presided over by the Lord Chief Justice of England. It is from the King's Bench Division that the judges of assize who go on circuit are chosen, and their sittings are deemed to be sittings of the High Court of Justice. From the King's Bench Division also are selected the judges of the Court of Criminal Appeal created by the Criminal Appeal Act of 1907.

2. The *Chancery Division*, presided over by the Lord Chancellor.

3. The *Probate, Divorce, and Admiralty Division*.

Every judge can act in any division, but in practice special classes of work are assigned to special divisions. Again, to prevent arrears and congestion, work may be transferred from one division to another. Further, in every cause commenced in the High Court, both law and equity are administered so that both plaintiff and defendant get the benefit of any relief to which they would have been entitled formerly in the Court of Chancery.

Local Courts.—The *County Courts* were established in 1840, and since then the duties of county court judges have been progressively increased. They have jurisdiction in ordinary cases up to £100 in suits for administration of estates of deceased persons, execution of trusts, for the redemption of mortgages and other cases of any equitable kind up to the value of £500, and in winding up companies when the capital is under £10,000. Cases, however, which involve sums beyond these limits are sometimes remitted to the county court judges for decision, and, where both parties consent, any Common Law action may be taken in the County Court. They have exclusive jurisdiction in cases under the Employers' Liability and Workmen's Compensation Acts. There is an appeal from the county court judge to the High Court.

Magistrates. A justice sitting alone may hear a case prior to commitment for trial, and has power to grant bail or discharge an accused person if the evidence is *prima facie* insufficient.

In the *Petty Sessions*, consisting of two or more justices, minor offences are dealt with; this court has also civil jurisdiction in judicial separations and maintenance orders.

Quarter Sessions, which sit once a quarter in counties and in some boroughs (where the Recorder is the judge), have competence to try with a jury all indictable offences except treason, murder, and certain grave crimes. They also act as a Court of Appeal from the decisions of Petty Sessions, and their judgments as courts of first instance are in turn appealable to the Court of Criminal Appeal. A Stipendiary Magistrate (who, unlike the Justice, is a paid official) may be appointed in boroughs on a petition to the Home Secretary.

Scotland.—The supreme court in civil cases in Scotland is the Court of Session, which was instituted in 1592 by an Act of the Scots Parliament to exercise judicial functions which had hitherto been discharged by a committee of Parliament. The court at first consisted of a Lord President with seven spiritual and seven temporal Lords of Session, and sat as one tribunal till 1808, when it was divided into two separate courts, known as *Divisions*, with co-

ordinate jurisdiction, the First Division presided over by the Lord President, the Second Division by the Lord Justice Clerk. A further reorganization took place in 1818, when five Lords Ordinary were constituted into an Outer House subordinate to the Inner House with its two Divisions. The Outer House is a court of first instance, and the judgments of any Lord Ordinary may be reviewed by the Inner House, and appeal may be taken from the latter to the House of Lords.

The High Court of Justiciary is the supreme court in criminal cases in Scotland. It superseded the old jurisdiction of the King's Justiciar, who till 1587 had heard pleas of the Crown in his 'justice ayres' or circuits throughout the country. The court was presided over by the Lord Justice General (an office now combined with that of Lord President of the Court of Session), and in his absence the court is presided over by the Lord Justice Clerk, who since 1808 is also President of the Second Division. The Lord Advocate, the Solicitor General, and four Advocates Depute act as Crown prosecutors in the Court of Justiciary, prosecutions at the instance of a private party, though competent, being virtually obsolete. Trials are always conducted with the aid of juries, which consist of fifteen, who, in addition to the two verdicts possible in England, *guilty* and *not guilty*, may return a verdict of *not proven*. There is no appeal from a decision of the Court of Justiciary, but it can review the decisions of all inferior criminal courts. By the Summary Jurisdiction (Scotland) Act it is competent to bring sentences imposed in the Sheriff Courts under review of the High Court of Justiciary by means of *stated case*. The Sheriff Courts have civil and criminal jurisdiction in the various shires. In questions affecting movable rights, their jurisdiction is unlimited, and they have also jurisdiction in actions of damages (which may be removed to the Court of Session), in maritime cases, and in questions regarding heritable subjects situated within the shire. They have no competence, however, to deal directly with questions of status, marriage, divorce, &c. Sentences imposed in criminal cases in the Sheriff Court are subject to review by the High Court of Justiciary, whose judgment is final. There is not as yet in Scotland, as there has been in England since 1907, a Court of Criminal Appeal, except that, under the Prevention of Crimes Act 1908, a convicted person who has also in addition been sentenced as an habitual criminal to a period of preventive detention may appeal against the latter sentence to a specially constituted tribunal composed of not less than three judges of the High Court of Justiciary.

Lawbugrows, Letters of, in Scots law, a writ or document in the name of the sovereign,

commanding a person to give security against offering violence to another. The person applying for the letters must swear to the truth of some cause of alarm, such as actual personal violence or threats of violence.

Lawn Tennis, an adaptation of the older game 'tennis' to outdoor courts, which has become very popular within recent years. The game is played in a court with a hard surface (such as *En-Tout-Cas*) or of grass, and may be played by two or four players, when the game is called 'singles' or 'doubles' as the case may be. The width of the court varies with the class of game. The balls used are hollow, of rubber, cloth-covered, weighing between $1\frac{1}{4}$ and 2 oz., and having a diameter of from $2\frac{1}{8}$ to $2\frac{3}{8}$ inches. There is no standard for rackets.

The Game.—Opponents stand on either side of the net, which is 3 feet 6 inches high at the posts, and 3 feet at the centre. One, who is called the *server*, stands with feet behind the base line and to either side of the centre at his discretion. He drives the ball to the *striker*, his opponent, so that it drops within the *service-line*, *half-court line*, and *side-line* of the court diagonally opposite to that from which it is served. If the ball strikes the net or does not drop within the limits described, it constitutes a *fault* against the *server*, who serves again. Two *faults* in succession count a point against the *server*. If the *striker* should miss the ball completely, or so strike that it hits the net or passes beyond the boundaries of his opponent's half of the court, a point is counted against the *striker*. If, during the *service*, the ball should strike the top of the net and, passing on, fall within the boundaries described, it constitutes a *let*, and is not a *fault*, nor need it be played by the *striker*, and the *server* is allowed another *service*. On either player winning the first point the score is 15 for that player; it is *love-15* or *15-love* according as the *striker* or *server* respectively is successful; and at the second winning stroke the score becomes 30 if the winner of the first stroke is successful, or *fifteen all* if his opponent in turn scores. A fourth winning stroke scores a game for the player, except when opponents have each won three strokes, the score being then called a *deuce*. The next winning stroke is called *advantage*, and, should the player who secures it lose the next stroke, the score falls to *deuce* again, and so on until either player wins two strokes in succession. A player who first wins six games wins a set, but if the scores reach *five games all*, the set cannot be won until either player wins two consecutive games. In most matches the best out of three sets is the rule in decision, in championship tournaments the best out of five. Players may change ends at alternate games according to arrangement, the right to serve being alternate also.

Hundicapping.—A *bisque* is one point allowance which may be claimed by the receiver of odds at any time during a set. An allowance of *half-fifteen* means one point at the beginning of the second and every subsequent alternate game. An allowance of *fifteen* means one point at the beginning of every game, in other words, this player starts with his score *fifteen*, his opponent being *love*. *Half-thirty* means an allowance of one point (15) at the beginning of the first game, two points (30) at the beginning of the second, and so on alternately. It is possible for such great odds to be allowed as 30, with an opponent at owe 30.

Championship Play.—The standard of first-class play is very high. From time to time expert young players appear, but a striking feature of championship play is the continued success year after year of middle-aged players. The veteran's conserving of his energies, his skill in placing, and his judgment compensate satisfactorily for the activity and forcefulness of the younger player.

The lawn tennis championships are held at Wimbledon, the meeting having been started in 1877. It has always an international quality, and since 1907, when an Australian was successful, the open championship has left this country. In 1908 the ladies' singles championship went to an American, and for several years the skill of Mlle Lenglen rendered her invincible. It is a feature of the lawn tennis championships that the winners of one year do not have to play right through the competition to defend their title the following year. The winner of the competition plays the last year's winner in the challenge round. The Davis Cup contests began in 1900, and have been played annually since then except between 1915 and 1918. In the earlier history of the game America and the British Isles alone supplied representatives with probable chance of success in an international contest; since 1914 Australasia has been particularly conspicuous.—**BIBLIOGRAPHY:** J. M. Heathcote, *Tennis, Lawn Tennis, Racquets*; J. H. Paret, *Lawn Tennis: its Past, Present, and Future*; W. Tilden, *Lawn Tennis*.

Lawrence, Sir Henry Montgomery, brother of Lord Lawrence, Anglo-Indian soldier and diplomat, born at Matara, Ceylon, 28th June, 1806, died 24th July, 1857. He obtained a cadetship in the Bengal artillery, proceeded to India in 1821, served in the Afghan campaign of 1843, and acted as agent for the Governor-General on the North-West Frontier, and Resident in Lahore from 1846 to 1849. On annexation he was made Chief Administrator in the Punjab. At the outbreak of the Mutiny he was made commander-in-chief of the province of Oudh. He attacked the rebels, but was defeated, and, having retired to

the residency of Lucknow, he organized the defence, which withstood a four months' siege although the city itself was in rebel occupation. He was wounded by a shell on the second day of the defence, and died two days later.

Lawrence, John Laird Mair, Lord, Governor-General of India, born at Richmond, Yorkshire, 24th March, 1811, died in London 26th June, 1879. Educated at Haileybury, he went to India in 1829, and was appointed Chief Commissioner of the Punjab (1853). During the Mutiny he exerted to the utmost the widespread influence which he had gained over the Sikhs, and he was able not only to keep the Punjab quiet, but also to organize 60,000 native troops for the capture of Delhi. He was known as the 'saviour of India', and his services were rewarded by his appointment as Governor-General in 1863. On his return to England in 1869 he was raised to the peerage under the title of Baron Lawrence of the Punjab and of Grately. He was buried in Westminster Abbey.—*Cf.* Sir R. Temple, *Lord Lawrence* (English Men of Action Series).

Lawrence, Sir Thomas, English painter, was born at Bristol 1769, died at London 1830. In 1787, he became a student of the Royal Academy, and devoted himself to portrait-painting. He was elected an associate by desire of the king; succeeded Sir Joshua Reynolds as painter to the king in 1792; became a Royal Academician in 1798; was knighted by the Prince Regent in 1815; and was elected president of the Royal Academy in 1813. He painted portraits of most of the notable persons of his time. He was the favourite portrait-painter at the English court, and was also employed at Vienna, where he painted the emperor, archdukes, Metternich, &c., and at Rome, where he painted the portrait of Pius VII, one of his finest works. Lawrence had considerable power as a designer and draughtsman. But he often became mechanical and slipshod, and his colour is generally dull and tasteless. His attempts at historical painting on a large scale were complete failures. He is well represented in the National Gallery, Tate Gallery, and Wallace Collection.

Lawrence, a town of the United States, in Essex county, Massachusetts. It contains the State university, and is principally supported by its extensive cotton- and woollen-factories, paper-mills, and manufactures of steam-engines. Created by Act of the Legislature on 20th March, 1845, it became a city in 1853. Pop. (1920), 94,270.

Lawrence, St., a Roman deacon and martyr of the time of Sixtus II. During the Valerian persecution the saint was commanded to reveal the treasures of the Church. For answer he collected the poor and the sick and presented them as the treasure which secured heaven. For

this he is said to have been roasted on a gridiron, A.D. 258. His day in the calendar is 10th Aug.

Lawson, Cecil Gordon, English landscape-painter, was born in 1851, and died in 1882. As a child he studied in the studio of his father, also an artist. To a large extent, however, he was self-taught. He first appeared at the Royal Academy in 1870 with *Cheyne Walk, Chelsea, The Minister's Garden* and *In the Valley*, which were exhibited in the Grosvenor Gallery in 1878, attracted much attention. In 1880 he painted *The August Moon*, now in the Tate Gallery. Death cut short his increasing success.

Lawsonia, a genus of plants belonging to the nat. ord. Lythraceæ, containing only one species (*L. inermis*), which is widely cultivated, especially in Oriental regions. It is the plant from which henna is obtained. It is a tall, slender shrub, with a profusion of small white fragrant flowers; it is sometimes spiny, and in this state has been described under the name of *L. spinosa*. See *Henna*.

Lawson's Cypress (*Cupressus Lawsoniana*), a species of cypress found in the valleys of Northern California, where it grows to the height of 100 feet. It was introduced into Britain in 1852, and has become a favourite in ornamental grounds. The branches are numerous and are drooping, slender, and regularly disposed, forming a symmetrical columnar mass of rich green spray.

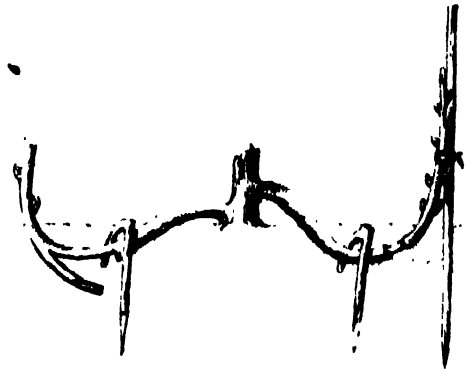
Layamon, also called **Lawman**, author of *The Brut*, a metrical chronicle of Britain from the arrival of Brutus to the death of King Cadwalader in A.D. 689, lived soon after A.D. 1200. From his own account he was in orders, and resided at Embsay, near Rudstone, or Redstone, now Lower Arley, on the Severn, in Worcestershire, where he would appear to have acted as priest. Layamon's *Brut* is mainly an amplified translation of the French *Brut d'Angleterre* of Wace, itself merely a translation with additions from Geoffrey of Monmouth's *Historia Britonum*, and that again confessedly a translation from a Welsh or Breton original. Layamon's work appears to have been completed in the first years of the thirteenth century. Its value is chiefly linguistic.

Layard, Sir Austen Henry, British Assyriologist, archaeologist, and diplomatist, born in Paris 5th March, 1817, and died in London 5th July, 1894. In 1839 he travelled in Persia, and subsequently (1845) began his famous excavations among the ruin-mounds of Nimrud, Nineveh, unearthing many rare cuneiform inscriptions and bas-reliefs, publishing the results of his work in *Nineveh and its Remains* (1849) and *Discoveries in the Ruins of Nineveh and Babylon* (1853). Layard entered Parliament in the Liberal interest (1852), became Under-Secretary

for Foreign Affairs in 1860, Commissioner of Works in 1869, and Ambassador at Constantinople in 1877. Cf. *Autobiography and Letters*, edited by W. N. Bruce (1903).

Lay Brothers are an inferior class of monks employed as servants in monasteries. Though not in holy orders, they are bound by the three monastic vows of poverty, chastity, and obedience. They wear a dress somewhat different from that of the other monks. In nunneries a similar distinction prevails between the nuns proper and the lay sisters.

Layers, in horticulture, branches pegged down or earthed up until they strike root, when they



Layering

are separated and grown as separate plants. Many species not readily multiplied by cuttings can be propagated in this way.

Laynez (B-neth'), Diego, second general of the Jesuits, and the real founder of the policy and organization of the society, born in Castile 1512, died 1565. He was educated at the University of Alcala, and from that he went to Paris, where he joined Ignatius Loyola. Laynez was ordained priest in Venice in 1537, and while there he and Loyola formed the project of establishing the Society of Jesus. After the order had been confirmed by Paul III (1540), and Loyola, at the request of Laynez, had been appointed the first general, he made many journeys for the purpose of extending the society of the Jesuits, and in 1558 he succeeded Loyola as general of the order.

Lay-reader, a layman who is permitted to read part of the service in the Anglican Church. The morning or evening prayer cannot be read by a layman unless he has been licensed to do so by the bishop, but the lessons may be read by permission of the incumbent.

Laz'arists, or **Fathers of St. Lazarus**, properly **Congregation of the Priests of the Mission**, an order of missionary priests founded

at Paris by St. Vincent de Paul in 1625. The name Lazarists is derived from the priory of St. Lazaire, which Adrien le Bon offered for the use of the brethren of the order in 1632. The institution of the Lazarists was approved by Pope Urban VIII in 1632. The object of the Lazarists was that of supporting missions and of ministering to the spiritual wants of the poor. The foundation was confirmed by letters-patent of Louis XIII, May, 1627, and the missionaries were erected into a congregation by Pope Urban VIII, 12th Jan., 1632. They have houses in all quarters of the world, and their total number is over 3000.

Lazulite, blue-spar, a hydrous phosphate of aluminium, magnesium, and iron, a mineral of a light or indigo-blue colour, crystallizing in monoclinic forms. It occurs usually as small veins.

Lazzaroni, formerly a class of persons in Naples without employment or home, and having no settled means of support. The name is said to be derived from that of Lazarus in the parable, though it is more directly connected with the hospital of St. Lazarus, which served as a refuge for the destitute of the city. For a long time they played an important part in all Neapolitan revolutions, and under Masaniello accomplished the revolt of 7th July, 1647, against the duc d'Arcos. They are now no longer a separate class, though the name is still loosely applied to the boatmen and fishermen of the city.

Lea, a tributary of the Thames, rising in Bedfordshire, entering Hertfordshire, flowing past Hertford and Ware, and, after forming the eastern boundary of Herts and Middlesex, entering the Thames just below Blackwall. Its length is about 40 miles, and it becomes navigable at Hertford.

Lead, a metal of a bluish-grey colour, with a high metallic lustre when recently cut, but soon tarnishing on exposure to the air, owing to the formation of a coating of carbonate of lead. Symbol, Pb (Lat. *plumbum*); atomic weight, 207.2; specific gravity, about 11.38. It is soft, flexible, and inelastic. It is both malleable and ductile, possessing the former quality to a considerable extent, but in tenacity it is inferior to all ductile metals. It fuses at about 620° F., and when slowly cooled forms octahedral crystals. It is a widely distributed metal. It is a constituent of a very large number of minerals, but in practice the metal is got from only a few of these, especially from the sulphide, carbonate, and one or two others. The most important of all the ores of lead is the *sulphide* or *lead glance*, also known as *galena* (q.v.). The *carbonate*, also called *cerussite*, or *lead-spar*, like most lead salts, is perfectly unmetallic in its appearance, and is not infrequently rejected from among common lead

ore as an earthy mineral. It occurs in veins in primitive and secondary rocks, accompanying galena and other ores of lead. It is abundant in several European countries, in Britain, in Ireland, and it has been found in various localities in the United States. The *sulphate of lead*, *anglesite*, or *lead vitriol*, was found originally in Anglesey. *Chromate of lead*, *crocoisite*, or *crocoite* was originally found in Siberia. It was in it that *chromium* was first discovered. *Phosphate of lead* is found accompanying the common ores of lead, though rarely in any considerable quantity. Finely crystallized varieties are found at Leadhills in Scotland, and in Cornwall.

There are five oxides of lead: (1) The suboxide (Pb_2O), of a greyish-blue colour. (2) The monoxide or yellow oxide (PbO), called also *massicot*. When produced by oxidation at a temperature above its fusing-point, PbO takes the form of shining yellow scales, called *litharge*. (3) The red oxide (Pb_2O_3), the well-known pigment called *red-lead* or *minium*. (4) The dioxide or brown oxide (PbO_2), obtained by treating red-lead with dilute nitric acid. (5) The sesqui-oxide (Pb_3O_3), obtained by oxidizing an alkaline solution of the monoxide. Of the salts formed by the action of acids on lead or on the monoxide, the carbonate or white-lead and the acetate or sugar of lead are the most important. The monoxide is also employed for glazing earthenware and porcelain. Carbonate of lead is the basis of white oil-paint and a number of other colours. The salts of lead are poisonous, but the carbonate is by far the most virulent poison. Lead is one of the most easily reducible metals, and from the native carbonate can be got by simply heating with coal or charcoal. The sulphide, however, which is the most abundant of its ores, is not so readily acted on by coal, and a reverberatory furnace, or a special variety of blast-furnace, is employed. The blast-furnace is now far the most common, being much cheaper to work and giving a larger output, while the charge can be modified so as to allow of the smelting of ores of all classes. For this process the ore is first submitted to a roasting and sintering operation, and then smelted in rectangular or circular water-jacketed blast-furnaces, coke being used as fuel and oxide of iron as flux. Lead obtained by any process is usually too hard for use owing to impurities; or it may contain a valuable percentage of gold or silver, and hence receives further treatment. Nearly all lead contains silver, and generally enough of the precious metals to make it worth extracting. This is commonly done by what is called the zinc process, depending on the fact that while zinc and lead mix when liquefied, they separate almost entirely on cooling, the zinc owing to its lightness rising to the top and carrying the

silver with it, which can then be secured. The lead, when judged sufficiently pure, is cast into ingots or pigs of lead. One part of tin and two of lead form an alloy fusible at 350° F., which is used by tinnmen under the name of *soft solder*. With antimony lead forms the important alloy called *type-metal*. *Pewter* is a hard alloy of four parts of tin and one of lead. For the poisonous effects of lead see *Lead-poisoning*.

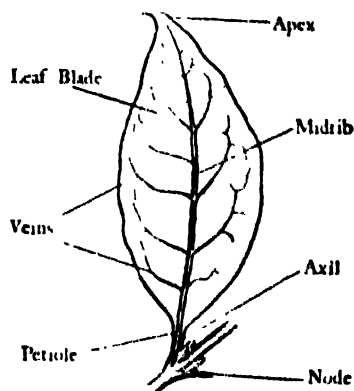
Leadhills, a mining village in South Lanarkshire, the highest in Scotland (1320 ft.), on Glengonner Water. Lead-mines were worked there in the thirteenth century, and since the middle of the nineteenth century the output has been considerable. Allan Ramsay, the poet, was born there in 1686. Pop. 850.

Lead-line, a device used on shipboard for ascertaining the depth of water and the nature of the sea-bed. The lead weighs from 10 to 14 lb., and carries a hollow on the under side which is filled with tallow, to which a sample of the sea-bed clings when the line is hove. The line is made of 1½-inch white hemp, and has a length of 25 fathoms. It is worked by means of leather, knots, and bunting to facilitate the calling of soundings. The fathoms at 1, 4, 6, 8, 9, 11, 12, 14, 16, 18, 19 are not marked, and are called *deeps*. The *deep-sea lead* has been almost entirely superseded nowadays by the *sounding-machine*, but has to be used when the machine breaks down. It is similar to the hand-lead, weighs about 28 lb., and carries a hollow bottom. The line, 100 fathoms in length, is marked similarly with the hand-line, but in carrying on soundings the ship is stopped.

Lead-poisoning (Plumbism) is usually chronic, and occurs among workers in lead and those engaged in the preparation of white-lead and other lead compounds. It is seen in painters, plumbers, and compositors. The chief symptoms are anaemia, marked weakness, colic, kidney disturbances, and neuritis, usually in the arm. A characteristic blue line appears on the gums if the teeth and mouth are neglected. Later, disease of the arteries appears, and is a most serious sequela. When lead-poisoning is present, all possible further absorption should be avoided by the patient, and treatment undertaken for the elimination of the poison; but now in all works where lead is in use poisoning should be prevented by inspection and protection of the worker, and by the provision of suitable washing accommodation.

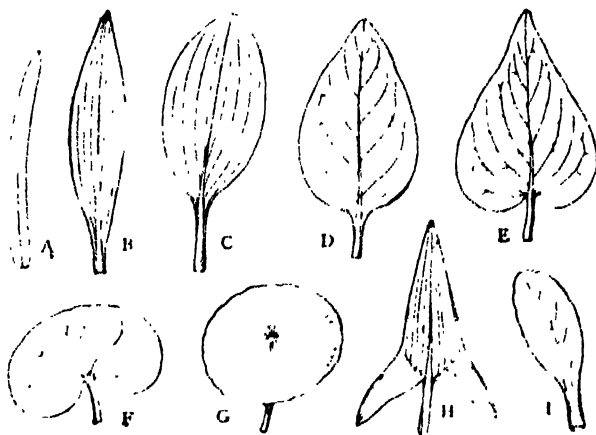
Leaf, a lateral appendage of the stem, typically thin, flattened, horizontal, and coloured

deep-green owing to the presence of numerous chloroplasts. Leaves arise from the superficial layers of the apical region of the stem, but differ widely in structure from the axis, being constructed so as to expose a large area of green



of Simple Leaf (Privet), showing parts

tissue for the purpose of carbon-assimilation and transpiration. The expanded portion or blade (*lamina*) is usually supported on a stalk (*petiole*), but the latter is absent in sessile leaves. The tissues of an average leaf are (1) an upper (ad-axial) and a lower (ab-axial) *epidermis*,



Shapes of Leaves: A, Linear; B, Lanceolate; C, Oval; D, Ovate; E, Cordate; F, Reniform; G, Round, or orbiculate; H, Sagittate; I, Spathulate, or spoon-shaped

which meet at the leaf-margin; (2) an elaborate system of veins or vascular strands, diverging from a mid-rib (in dicotyledons) or from a series of longitudinal principal veins (in monocotyledons); (3) a web of green parenchyma or *mesophyll*, occupying the interstices of the vascular

network. In ordinary horizontally expanded leaves the mesophyll consists of closely packed *palisade-cells* rich in chlorophyll next the upper surface, and of a *spongy tissue* of irregular cells with large intercellular spaces towards the lower side. Stomata may occur in both epidermal layers or only in the lower epidermis. Carbon-assimilation takes place mainly in the palisade tissue, and the leaf as a whole probably represents the chief chemical laboratory of the plant, as it is here especially that the food-materials brought from the soil to the transpiration-stream meet with the carbon fixed by the chloroplasts. Leaves are arranged on the stem in an orderly manner, either in pairs (*opposite*), or singly in spirals of varying steepness (*alternate*). By this means, and also through variations in length of the leaf-stalks, and bending or twisting of the petiole or of the blade itself, overlapping is avoided as far as possible, so that each leaf obtains a proper degree of illumination. The leaves of xerophytes, water-plants, &c., and leaf-structures borne on underground stems or on floral axes, are often greatly modified from their typical form.

Leaf-curl, a destructive disease of the peach tree. The leaves become curled and discoloured, and fall off before their time; infected branches bear no fruit. It is due to a fungus, *Ecosseus deformans*, and can be checked by spraying and rigorous pruning. See *Macrosporium*.

Leaf-cutting Insects, a name given to certain species of solitary bees (*Megachile* and *Osmia*), from their lining their nests with fragments of leaves and petals of plants cut out by their mandibles. Some of the ants (species of *Atta*), native to tropical America and Texas, are also leaf-cutters. The pieces of leaf are stored underground, and a kind of fungus is cultivated upon them to serve as food.

Leaf-insects, the name given to orthopterous insects of the genus *Phyllium*, belonging to the family Phasmidae, and popularly known also by the name of *walking-leaves*. Some of them have wing-covers so closely resembling the leaves of plants that they are easily mistaken for the vegetable productions around them. The eggs, too, have a curious resemblance to the seeds of plants. They are for the most part natives of the tropical regions of the Old World. The males have long antennae and wings, and can fly; the females have short

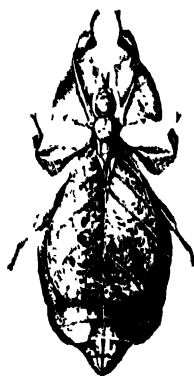
antennae, and are incapable of flight. Stick-insects belong to the same family.

League (from the Gaulish *leuca*, *leuga*), a measure of length which was adopted by the Romans from ancient Gaul, and fixed at 1500 *passus* or paces, practically a mile and a third. The English league, introduced by the Normans, was equal to about 3 modern statute miles, and this is still used as a geographical (nautical) measure for one-twentieth of a degree (3 nautical miles), equivalent to about $3\frac{1}{4}$ statute miles. The French metric league is reckoned as equal to 4 kilomètres or 437 yards.

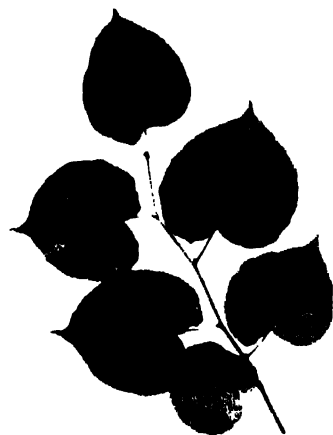
League, historically, an alliance or confederacy between princes, states, or peoples (*Solemn League and Covenant*) for mutual aid or defence. Want in French history is known distinctively as *The League* (*Sainte Ligue* or *Holy League*) was that organized by Henry, duc de Guise, in 1576, against Henry III of France. Its ostensible object was the consolidation of Roman Catholicism, but the Guises used the League for political leverage to secure the throne upon the death or removal of the king, whose heir-apparent was the Huguenot Henry of Navarre. The great popularity of the Guises brought all Paris and half the provinces under the banner of the League, which was sanctioned by the Pope and applauded by the King of Spain. In 1588 the duc de Guise and his brother, Louis the Cardinal, were murdered at Blois at the king's instigation, whereupon the League declared the throne to be vacant, and named Charles, duc de Mayenne, the third brother of Guise, Governor-General of the kingdom. Henry III appealed to Henry of Navarre for assistance, but was assassinated by a fanatic leaguer in 1589. As heir to the throne, Henry of Navarre waged war with the League until 1593, when he effected a compromise by abjuring the Protestant faith and becoming nominally a Catholic, when the League was formally dissolved. Several of the novels of Alexandre Dumas are based on the activities of the League.—Cf. F. A. M. Mignet, *Histoire de la Ligue*.

League of Nations, an association of nations formed on 28th April, 1919, for the purpose of promoting international co-operation and achieving international peace and security.

The idea of a League of Nations, of an International Court of Arbitration, and of a peaceful settlement of international disputes is not a new one. There are plenty of historical precedents showing that even if the foundations of such a League had not already been laid in ancient times, the idea certainly existed. Associations of neighbouring tribes and cities for the purpose of regulating mutual intercourse existed among the Greeks, the most important of such associations being the Amphictyonic Council.



Leaf-insect
(*Phyllium siccifolium*)



Beech



Sycamore



Yew



White Elm



Aspen



White Poplar



Black Poplar

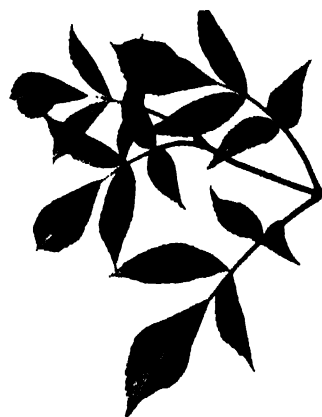
BRITISH TREES



Willow



Alder



Beech



Hornbeam



Dogwood



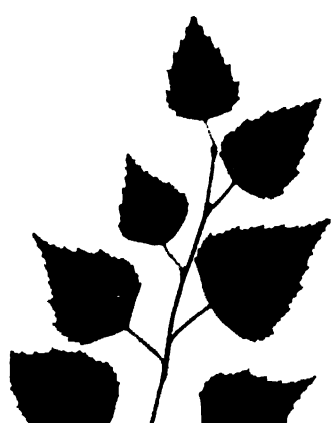
Sycamore



Hawthorn



Pear



Birch

During the Middle Ages the emperor and the Pope, the temporal and the spiritual heads, ruled over Europe, and both wielded, though in a vague way, an international authority. Whilst national feeling was growing everywhere, the international ideals of peace and solidarity were nevertheless developed. A real attempt at a confederation was made after the Napoleonic wars, when the Holy Alliance was formed. The experiment failed, and the balance of power predominated. Towards the end of last century the desire for an international and permanent Court of Arbitration, a court which would settle in a peaceful way all international disputes, had gradually grown up, and, at the instigation of Tsar Nicholas II, the Hague Court of Arbitration was instituted on 19th Sept., 1900. The Hague Court did useful work, but it had no power to prevent a European conflagration, as has been amply proved by the European War. In the course of this war, however, the idea of a real League of Nations gained ground. Practical humanity at last recognized that a League of Nations was the only way to a durable peace. One of the results of the European War was the growth and subsequent recognition of nationalism; the increase in number of small independent states, which, as time wore on, would naturally threaten to become a new danger to Europe. There emerged, therefore, the idea of a League of Nations, and of a contract according to which the contracting parties would bind themselves "never to presume to set their own interests above those of mankind".

Many were the supporters of the League of Nations idea, but many also were its critics, who saw in it a mere pretext for aggrandizing the four Great Powers at the expense not only of Germany, Austria, and Turkey, but also of the smaller states.

The idea was first expressed by President Wilson, and clearly stated by him on 8th Jan., 1918. It constitutes the fourteenth of his famous Fourteen Points: "A general Association of nations must be formed under specific covenants for the purpose of affording mutual guarantees of political independence and territorial integrity to great and small states alike".

The Covenant of the League of Nations, as adopted by the plenary session of the Peace Conference on 28th April, 1919, defines the League as follows: "In order to promote international co-operation and to achieve international peace and security, by the acceptance of obligations not to resort to war, by the prescription of open, just, and honorable relations between nations, by the firm establishment of the understandings of international law as to actual rule of conduct among Governments, and by the maintenance of justice and a scrupulous

respect for all treaty obligations in the dealings of organized peoples with one another, the high contracting parties agree to this Covenant of the League of Nations."

The Covenant contains twenty-six articles, and was signed by the following states and signatories of the Treaty of Peace: United States of America, Belgium, Bolivia, Brazil, British Empire—Canada, Australia, South Africa, New Zealand, India, China, Cuba, Czecho-Slovakia, Ecuador, France, Greece, Guatemala, Haiti, Hejaz, Honduras, Italy, Japan, Liberia, Nicaragua, Panama, Peru, Poland, Portugal, Roumania, Serbia, Siam, Uruguay.

The following states were invited to accede to the Covenant: Argentine, Chile, Colombia, Denmark, Netherlands, Norway, Paraguay, Persia, Salvador, Spain, Sweden, Switzerland, Venezuela.

On the 16th Jan., 1920, the first meeting of the Council of the League of Nations was held in Paris, and comprised representatives of Great Britain, France, Italy, Japan, Spain, Belgium, and Brazil. The French representative, Léon Bourgeois, President of the French Senate, was elected chairman, and Sir James Eric Drummond, K.C.V.O., C.M., installed as permanent secretary. The Council also arranged for a general assembly of the League, which was subsequently held in Nov., 1920, at Geneva, the official seat of the League as per Article VII of the Covenant.

The Council of the League, consisting of nine members, as per Article IV of the Covenant, was elected for four years. In Dec., 1920, the Council decided to admit Austria, Costa Rica, Bulgaria, and Finland as members of the League, but refused to grant the same privilege to Azerbaijan, the Ukraine, and the principality of Lichtenstein. In 1921 Nicaragua gave notice of withdrawal.

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Leamington (Royal Leamington Spa), a municipal borough and watering-place of England, in Warwickshire, served by the Great Western and London & North-Western Railways. The springs include the three varieties of sulphurous, saline, and chalybeate. Pop. (1921), 25,946.

Leap-year, one of the years of 366 days, including the date 29th February. Every year is

a leap-year which is divisible by four without remainder, except the concluding years of centuries, every fourth only of which is a leap-year; thus the years 1800 and 1900 are not leap-years, but 2000 and 2400 are. See *Calendar*.

Lear, Edward, British artist and author, was born at Holloway on 12th May, 1812, and died in Jan., 1888. He began his career as an artist with various ornithological drawings. In 1831 he became a draughtsman to the Zoological Gardens, and in 1832 he published *The Family of the Psittacidae*, a volume of coloured plates. His work attracted the attention of the thirteenth Earl of Derby, who employed Lear from 1832 to 1836 to draw his menagerie at Knowsley. Lear became a great favourite with the Stanley family, especially with the grandchildren, and it was for the future fifteenth earl that *The Book of Nonsense* was composed. This book was extremely popular; it was published in 1846, and run through twenty-six editions in its author's lifetime. It was followed by other works of a similar nature: *Nonsense Songs and Stories* (1871), *More Nonsense Songs* (1872), and *Nonsense Botany and Nonsense Alphabets*. Lear, if not the inventor, was at any rate the popularizer of the 'Limerick'; indeed it has been suggested that this word has been coined from his name, being a variant of the jocular word 'Learie', coined by Father Matthew Russell. Lear was an indefatigable traveller; he left England in 1837 on account of his health, and never again resided there permanently. He produced several illustrated books of travel, such as *Journal of a Landscape Painter in Southern Albania* (1852) and *Journal of a Landscape Painter in Corsica* (1870). One of his last works (posthumously published) was a set of about two hundred illustrations to Tennyson's poems. He was a personal friend of Tennyson, who addressed him in a poem entitled *To E. L. on his Travels in Greece*. Lear's nonsense books are classics in their way; nor has more nonsensical nonsense ever been intentionally written.

Lease and Leasehold. A lease may be defined as a permission to occupy lands or tenements for life or a certain number of years, or during the pleasure of the parties making the contract. The party letting the lands or tenements is called the *lessor*, the party to whom they are let the *lessee*, and the compensation or consideration for the lease the *rent*. A lease for a period not exceeding three years may be by verbal contract. If, however, the term be longer than three years, the lease must be by deed. A breach of any of the covenants contained in a lease was formerly sufficient to render it void, but now any breach may be compensated by a money payment. The power to lease necessarily depends upon the extent of the lessor's estate in

the land or tenement to be leased. A proprietor who has only a life-estate can of course lease his property only during his life. This is the case with a great part of the landed estates of Europe, the very object of entailments and other limitations being to secure the property against alienation, and against incumbrances to the prejudice of the heir or successor to the inheritance; and yet if the incumbent could not make a lease for a certain time, it would be a great abridgment of the value of the estate to himself, as well as to his successor. The laws therefore provide that certain proprietors of estates for life may lease, on certain terms, for any time not exceeding a certain period, as twenty-one years. The English common law makes a distinction as to the dignity of leasehold estates, which in many cases does not correspond to their comparative value and importance, the maxim being that a life-estate, being that of a freeholder, is greater or of more dignity than a lease for ever so many years, as a hundred or a thousand. A freehold is real estate; whereas a lease is but a chattel interest, though the term may be longer than the longest life. See *Landlord and Tenant*.

Leather is the name given to the non-putrescible substance formed when the skins of animals are treated by various processes. Wet skins putrefy and decay, whilst dry ones are hard and horny; the art of leather manufacture deals with the conversion of the raw skins into a permanent flexible substance.

The manufacture of leather was probably one of the earliest arts practised by mankind, and there is evidence to show that the method used consisted in rubbing the fat of the animal on the raw skin, and kneading and stretching it in a warm place until a soft and durable leather was obtained. Similar methods, dependent on the use of butter, egg-yolk, brains, oils, &c., are used at the present time by the Tartars, North American Indians, and other peoples, and also in the dressing of furs, and the manufacture of chamois-leather and of certain kinds of laces. In the preparation of leather the hides and skins of various mammalia, such as oxen, cows, horses, goats, sheep, deer, &c., are chiefly used. Such skins consist essentially of two layers: the outer one, called the *epidermis*, is composed of cellular tissue containing the roots of the hair, and is valueless from the tanner's point of view; whilst the thicker inner layer, termed the *corium* or true skin, is the part which is converted into leather. The corium consists of a network of fine colourless fibres, which are capable of being split into still finer fibrils. Chemically, the substance of which it is composed is closely related to gelatine (q.v.), into which it is readily changed on boiling with water. Before the hides or skins can be converted into leather, various prepara-

tory processes are necessary to remove the hair and to fit the skin for tanning.

Soaking.—If the hides are uncured ('green'), they are soaked in water for a few hours to restore them to their soft and natural condition and to remove adhering blood and dirt. Wet-salted hides require a longer soaking in several changes of water, and those which have been dried or dry-salted need a still longer time, and also a certain amount of mechanical action to soften them thoroughly. During the soaking process great care must be taken to avoid putrefaction, or the resulting leather will be of an inferior quality. For this reason the addition of antiseptics to the water used for soaking is advisable in hot weather.

Depilation is the term applied to the process by which the hair is removed. This may be effected in two different ways.

The method of depilation which is now almost universally used is known as 'liming', and is carried out as follows:

The soaked hides or skins are placed in pits containing milk of lime, i.e. slaked lime stirred up into a cream with water and further diluted. They are hauled out of the pits and put back again each day to ensure uniform action, the time of treatment varying from a few days to about three weeks, according to the nature of the skin and the type of leather required. The lime loosens and partially dissolves the epidermis and hair; it also swells the gelatinous fibres of the corium, and at the same time dissolves the cementing substance between them, loosening and separating them into their finer fibrils. The further this action proceeds the softer and looser is the resulting leather. For sole leather, where a firm and solid product is required, only a short liming is needed. The addition of caustic alkalis or sulphides of lime, soda, or arsenic to the milk of lime is often used to hasten the process of unhairing and to produce leathers having special characteristics. Whichever method of loosening the hair be adopted, its removal is effected by scraping with a blunt two-handled knife. Sheepskins may be unhaird by painting the flesh side with a mixture of slaked lime and sodium sulphide in the form of a paste. After a few hours, the wool is loosened sufficiently to be pulled out by hand in an undamaged state; the skin may then be further prepared for tanning.

Deliming.—Before the unhaird hides can be actually converted into leather it is essential that the lime contained in them be completely removed, as its presence would interfere with the tanning processes. For sole leather, the hides, after a thorough washing in soft water or dilute acids to dissolve out the lime, are ready for the actual tanning process, but for the softer leathers

more thorough treatment is necessary, not only to remove the lime but to soften the skin still further by removal of more of the cementing substance between the fibres. This treatment is known as 'bating', and consists in steeping the skins in a fermenting infusion of pigeon- or hending. The nature of the process is not thoroughly understood, but the softening effect is due to the destructive action of ferments on the cementing substance, while at the same time the lime is partly removed by the solvent action of the weak organic acids produced in the process. For the lightest leathers, such as glove-kid and lamb, dog-dung is used, and the process is then known as 'puering'. In both cases the skins lose the swollen condition attained during liming and become extremely relaxed and soft. These dung infusions are somewhat uncertain in their action, and may readily lead to permanent damage to the skins if the process is carried too far. To take their place, a material called 'erodin' is now often used; it consists of a nutritive medium prepared from gelatinous matter, which, when inoculated with a pure culture of *bacillus erodians*, is capable of imitating the effect of the dung infusions, but with less danger to the skins. In the manufacture of the softer varieties of leather it is necessary at this point to treat the skins with a slightly acid liquor in order to complete the removal of lime. The method employed is known as 'drenching', and consists in immersing the skins in a fermenting infusion of bran. Acetic and lactic acids are formed, which dissolve the last traces of lime and also slightly swell the skin. In place of the bran drench, weak acids such as lactic, formic, and boric acids may be used with success.

Tanning. Tannin or tannic acid is obtained from various vegetable products, such as oak-bark (which is one of the oldest tanning materials), sumach, cutch, gambier, myrobalans, chestnut extract, valonia, &c. On extracting these materials with water, a solution of the tannin is obtained which has the property of combining with the gelatinous fibres of the hide or skin to form an insoluble and stable product, leather, which remains soft and flexible on drying. Owing to the impervious nature of the hide, the complete penetration of the tan-liquor takes a considerable time, varying with the thickness of the hide and the strength of the liquor. If too strong a liquor were used at the commencement, the outside of the hide would become hard and contracted, producing what is known as 'drawn-grain'; the subsequent tanning of the interior would also be impeded. This is avoided by the use at first of a very weak infusion, which has already been used for hides in a more advanced state; the hides are then suspended in pits containing successively stronger liquors. In the

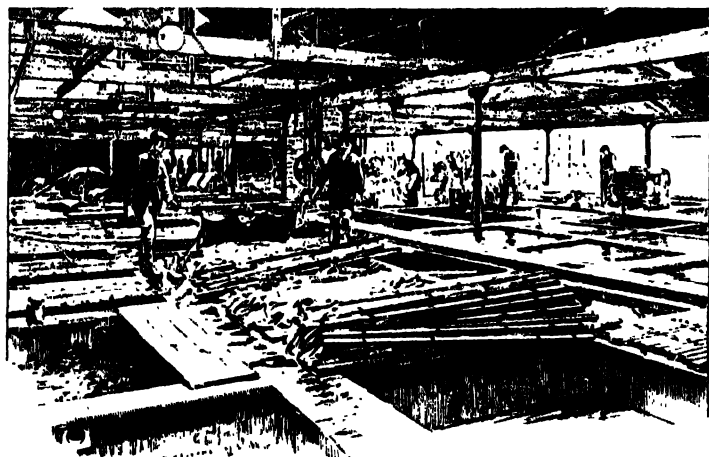
latter part of the process the hides are frequently dusted with some ground tanning material, and laid in still stronger liquors for periods of about a week at a time. The tanning of hides for sole-leather occupies from three to six months; formerly two years or more were required when oak-bark alone was used as a source of tannin. The tanned hides are washed in water, dried, smoothed, and compressed by mechanical means, and are then ready for use.

The finer and lighter varieties of leather, such as goat, calf, sheep, seal, &c., for bookbinding, upholstery, and many other purposes, are mostly

They are then allowed to 'age' for from one to two months in order to fix the tannage, soaked out in water to remove the superfluous alum and salt, and finally dried and again staked.

Chrome-tanned leathers are made by drumming the skins for several hours in a solution of chrome alum or of chromium sulphate, rendered slightly basic with soda; they are then allowed to lie in piles for some days, and after washing are treated with a weak solution of borax or some other mild alkali to remove all traces of acidity. The skins are finally treated with a 'fat-liquor' (an emulsion of soap and oil) to improve the quality of the leather, which would otherwise be of a somewhat 'woolly' nature.

Chrome tanning may also be carried out by what is known as the two-bath process, in which the skins are first steeped in a slightly acid solution of potassium or sodium bichromate, and then transferred into a solution of sodium thiosulphate (photographers' 'hypo'), also slightly acidified. Chrome leather has largely replaced vegetable-tanned leather for many purposes, owing to the short time occupied in tanning and also because of its strength and resistance



Tanning-pits

tanned with sumach, the skins being treated in drums, or in vats fitted with paddles, in order to ensure uniform treatment and to hasten the process, the time of tannage varying from one or two days to a few weeks.

Tanning is the name applied to the process by which skins are converted into leather with the aid of metallic salts, those of aluminium and chromium being the most important commercially.

Alum tawing is used chiefly for the production of white leathers, such as glacé-kid, calf-kid, 'skivers' for capping chemists' bottles, and for the dressing of sheepskins in the wool. The skins prepared in the manner already mentioned are treated in a rotating drum for several hours with a warm solution of alum and salt, with or without the addition of egg-yolk and flour, and are allowed to lie in piles overnight. Next day they are hung up to dry, at first in the air, and finally in a moderately hot room. When dry, the skins, which are hard and horny, are damped back with water to a half-dry condition, and 'staked' by drawing them across a blunt-edged knife fixed in a vertical position.

tance to steam and high temperatures. 'Box-calf' and 'willow-calf' for boot and shoe uppers are made by this process.

Chamoising.—Wash-leather or chamois-leather is prepared from the skins of sheep, deer, &c., by treating them with various oils; cod, seal, and whale oils being usually employed. Buff leather is a similar product obtained from ox or cow hides. The prepared hides or skins are smeared with the oil in the slightly moist state, and placed in a mill which beats and kneads them. During this process the oil is absorbed by the skins, and the moisture evaporated off by the heat produced by friction in the mill. When there is no longer any fleshy odour from the skins, they are hung up in a warm room; this produces a gentle oxidation, causing a permanent combination between the oil and the skin. The excess of oil is then pressed out, and the skins washed in a hot soda solution and dried.

Currying is the term given to the finishing process, applied to leather intended for boot uppers, harness, belting, and other purposes, where flexibility and resistance to water are required. It consists essentially in impregnating

the leather with fats, oils, and waxes, but includes also many mechanical processes, such as scouring, shaving, &c., which improve the appearance of the leather. For the uppers of boots and shoes the leather is 'coloured' by rubbing on a mixture of oil and lamp-black, followed by sizing and smoothing by pressure. For patent and enamelled leathers, successive coats of a varnish composed of Prussian blue boiled with linseed oil are applied. 'Morocco' leather is made from goatskins tanned with sumach. It is glazed by damping with a solution of albumin and milk, and, after drying, is polished by friction under a smooth cylinder of agate.—BIBLIOGRAPHY: H. R. Procter, *Principles of Leather Manufacture*; C. T. Davis, *Manufacture of Leather*.

Leather, Artificial, the general name of certain fabrics possessing some of the qualities, and often the appearance of leather. One of the earliest methods of fabrication consisted in applying oily pigments to cloth which was subsequently rolled and coated with a sort of enamel paint. An article of this sort, known under the name of leather-cloth, was first produced in America about 1840. Another kind consists of leather parings and shavings reduced to a pulp, and then moulded into buckets, machinery-hands, picture-frames, and other useful and ornamental objects. A so-called vegetable leather consists of caoutchouc dissolved in naphtha, spread upon a backing of linen. It is of considerable strength and durability, and is used for table-covers, carriage-aprons, soldiers' belts, harness, and bookbinding. Most artificial leather is obtained by varnishing textiles with coatings of some resinous substance, and then painting or embossing them.

Leatherhead, a town of England, in Surrey, on the Mole, 11 miles E.N.E. of Guildford, with a school for clergymen's sons, and some breweries. Some regard Leatherhead as the 'Highbury' of Jane Austen's *Emma*. Pop. (1921), 5821.

Leather-head, an Australian bird, the *Philemon corniculatus*, a species of honey-eater, so called from its head being devoid of feathers and presenting a leathery appearance; called also *Friar-bird* or *Monk*, and, with reference to its note, *Four o'clock*, *Poor Soldier*, and *Pimlico*.

Leaven, dough in which fermentation has commenced, employed to ferment and render light the fresh dough with which it is mingled. Its use dates from remotest antiquity, and it is especially mentioned in the Bible, where the Israelites are strictly forbidden to eat anything leaven during the festivity of Mazzot, or Passover (*Exod.* xii and xiii; *Deut.* xvi). In the New Testament leaven and corruption are sometimes regarded as synonymous terms, e.g. *Matt.* xvi, 9-12; *Mark* viii, 15.

Leavenworth, river port, railway centre, and

commercial city of Kansas, United States, on the Missouri, in a rich agricultural region. There are sawmills, flour-mills, brickworks, breweries, manufactories of carriages, wagons, furniture, and shoes, also coal-mines in the vicinity. Founded in 1854, it became a city in 1855. Pop. 16,012.

Lebanon, a town of the United States, in Lebanon county, Pennsylvania. It is a seat of iron and other industries. Settled in 1743, it became a city in 1885. Pop. (1920), 24,643.

Lebanon, Mountains of, two nearly parallel mountain ranges in the north of Lebanon, stretching from south-west to north-east, and enclosing between them a valley about 70 miles long by 15 miles wide, known anciently as Cœle-Syria, now called Beka'a. The range on the west is called Lebanon, and that on the east Anti-Lebanon; the Arabs, however, call the former Jebel-Libnan, and the latter Jebel-el-Shurki. Lebanon, which runs almost parallel to the Mediterranean coast, is the loftier range of the two, and presents almost a continuous ridge. Though under the snow limit, snow and ice remain throughout the year in the higher ravines. In the south part of the chain the Upper Jordan has its source. The habitable districts are occupied towards the north by the Maronite Christians, and towards the south by the Druses. The forests of cedar for which Lebanon was famed have to a large extent disappeared.

Lebanon, The, a maritime state of Syria, founded 1st Sept., 1920, and under French protection. It extends in a narrow strip from the Palestine frontier northwards to Dahr-el-Chodib, and east to west from the Mediterranean to the heights of Anti-Lebanon. Beyrout is the capital; other towns being Tripoli (pop. 30,000) and Zahleh (pop. 14,000). The state is traversed north to south by the Syrian Trunk line (Hejaz Railway) with branches to Tripoli and Beyrout. Tobacco, iron, and lignite are produced. Sunnite Mahomedanism with some Shi'ah prevails. The monetary unit is the Syrian pound of 100 piastres (1 piastre = 20 centimes).

Lebrija (le-bré'ja; Lat. *Nehrisia Veneria*), a town of Spain, Andalusia, province of Seville, and 28 miles south by west of the city of that name, near the left bank of the Guadalquivir. Pop. 11,506.

Lebrun (le-brûn), Charles, French painter of historical and mythological subjects, born at Paris in 1619, died in 1690. He studied with Vouet, and then in Rome under Poussin. On his return he was employed by Lambert de Thorigny at his hotel on the Île St. Louis, and by Fouquet at Vaux; and was introduced by Mazarin to the king. In 1648 he took part in the foundation of the new Royal Academy of

Painting and Sculpture, of which he became president. From 1661 he was principally employed in the decoration of the residences of Louis XIV, notably the Louvre, Versailles, Seaux, and Marly. Under Colbert, he not only carried out several series of monumental paintings, but supervised and controlled a large staff of artists engaged on similar work. In particular, he was director of the Gobelins Tapestry Manufactory. After the death of Colbert, in 1683, Lebrun was superseded by his rival, Mignard. Lebrun's work admirably reflects the age. Dignified and heroic in conception, it is often merely pompous.

Le Brun, Marie Louise Elizabeth (née *Vigée*), French painter, born in Paris 1755, died there in 1842. She studied under Briard, was influenced by Greuze and Joseph Vernet, and soon became a popular painter at the court of Marie Antoinette. In 1783 she was elected a member of the Academy. During the Revolution she worked in Italy, Vienna, and St. Petersburg (Petrograd), returning to France in 1801. She stayed in England from 1802 to 1805, and was in Switzerland from 1808 to 1809, but finally settled in France. Her work includes many portraits of considerable superficial charm, and allegorical subjects sentimentally treated. She and her daughter are the subject of a famous picture by David, now in the Louvre.

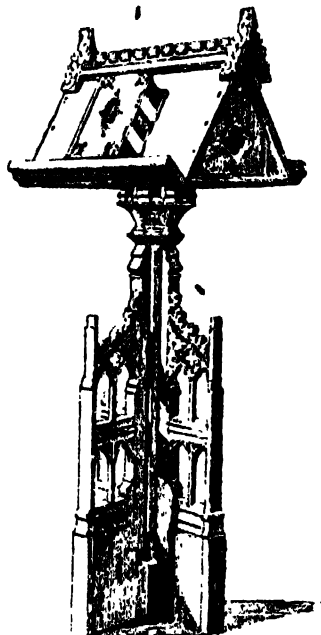
Lecce (l'c'hü), a town in Southern Italy, the ancient *Lupiae Civitas*, capital of the province of its own name, 50 miles E.S.E. of Taranto. Pop. 37,700.

Lecco, a town of Northern Italy, on an arm of Lake Como called Lake Lecco (*Lago di Lecco*). It is a steamboat station and a semi-industrial town lying at the foot of Monte Resegone. There is a church and ruined castle, and a stone bridge of ten arches, erected by Azzone Visconti in 1335, and provided with fortified towers at either end. Pop. 12,000.

Lecky, William Edward Hartpole, historical writer, born near Dublin 1838, died in 1903. He was educated at Dublin University, for which he was member of Parliament from 1896 to 1903. He was made a Privy Councillor in 1897. He wrote: *Leaders of Public Opinion in Ireland; History of the Rise and Influence of the Spirit of Rationalism in Europe; History of European Morals from Augustus to Charlemagne; History of England in the Eighteenth Century* (8 vols.), afterwards published in two portions dealing with England and Ireland respectively.

Lectern, the reading-desk or stand on which the larger books used in the service of churches are placed. They have been made of various materials and often in highly artistic forms. Many are in the form of an eagle, the outspread wings supporting the volume. In the lecterns

of the Pisan Tuscan schools of the twelfth, thirteenth, and fourteenth centuries the eagle rests upon a group of the three other living creatures,



Lectern, 1450. Ramsay Church, Hunts.

symbols of the Evangelists, the Angel, the Lion, and the Bull.

Lecythidaceæ, a nat. ord. of polypetalous dicotyledons, consisting of large tropical trees, and including the brazil-nut (*Bertholletia*), sapucaia-nut (*Lecythis*), and cannon-ball tree (*Couroupita*).

Leda, in Greek mythology, the wife of the Spartan king Tyndareus. By Zeus, who took the form of a swan, she was the mother of Castor and Pollux. In another story she was the mother by Zeus of Pollux and Helen, and by Tyndareus of Castor and Clytemnestra.

Ledbury, a town of England, in Herefordshire, at the southern extremity of the Malvern Hills, 14½ miles from Hereford. It has a handsome ancient church in the Norman style, with a detached tower and spire. It was at Ledbury that Mrs. Browning passed her girlhood. Pop. (1921), 3152.

Lee, Nathaniel, an English dramatic poet, born about 1653, died in 1691 or 1692. Educated at Cambridge, he afterwards went to London, and in 1675 produced his tragedy of *Nero*, from that time to 1681 producing a tragedy yearly, the best known being *The Rival Queens* (1677). After his failure as an actor he became insane

(1684), and was confined in Bedlam, then Bethlehem Hospital, until 1688, when he was discharged and wrote two more tragedies, *The Princess of Cleves* and *The Massacre of Paris*, which appeared in 1689 and 1690.

Lee, Robert Edward, American general, commander-in-chief of the Confederate army, and one of the most skilful tacticians who took part in the great Civil War of 1861-5, was born in Virginia 19th Jan., 1807, died 12th Oct., 1870. In 1829 he left the military academy of West Point with the rank of second lieutenant of engineers. After making a tour in Europe he obtained a captaincy in 1838, and in 1847 was appointed engineer-in-chief of the army for the Mexican campaign, in which his brilliant services at Cerro-Gordo, Contreras, Cherubusco, and Chapultepec (where he was wounded) speedily gained for him the rank of colonel. From 1852 to 1855 he was superintendent of military studies at West Point. In 1861 he was in command of the First United States Cavalry Regiment, and, although offered a high command by the Federals, he resigned his commission on the secession of Virginia from the Union. He joined the levies of his native state, being subsequently selected by President Davis as commander-in-chief of the North Virginian Confederate Army (31st May, 1862). In a seven days' battle in June, 1862, he defeated the Federal army under McClellan, and, aided by Stonewall Jackson, defeated Pope at Cedar Run, and at Bull Run (30th Aug.), forcing him back upon Washington, and changing the Confederate fortunes from defeat into merited success. Lee now crossed the Potomac into Maryland to threaten Washington itself, but a series of checks obliged him to withdraw behind the Rappahannock. On the 13th Dec. he routed the Federalists under Burnside at Fredericksburg, and on the 2nd and 3rd May, 1863, gained the splendid victory of Chancellorsville over Hooker. After this Lee resolved to push on to Washington, but was beaten by Meade at Gettysburg, 1st and 3rd July, 1863, and forced to retreat into Virginia. In the autumn of that year he collected all his forces, defeated Meade on 7th Nov., and in May, 1864, advanced upon Fredericksburg, while Grant at the head of a large army entered Virginia. A series of sanguinary engagements took place at Spottsylvania (5th to 10th May), in which Lee was worsted, but on 3rd June he defeated Grant at Chickahominy. The Federals, however, with their great superiority of men and matériel, gradually hemmed in the Confederate forces, and on 9th April, 1865, Lee and his army surrendered to Grant at Burkeville. General Lee then retired into private life, was elected president of Washington College, Lexington, Virginia, in 1865, where he died.—BIBLIOGRAPHY: G. M.

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Adam, *Life of General R. E. Lee*; T. N. Page, *Robert E. Lee, Man and Soldier*.

Lee, Sir Sidney, Shakespearian scholar and editor of the great *Dictionary of National Biography*, was born in London 5th Dec., 1859, and educated at the City of London School and Balliol College, Oxford. From 1883 to 1890 he was assistant editor of the *Dictionary of National Biography* (Leslie Stephen being editor), joint-editor from 1890 to 1891 (the first twenty-six volumes being now issued), and afterwards sole editor, so that under him appeared the remaining volumes, up to vol. lxiii, with the six of supplement and one of epitome. In 1901 he was appointed Clarke lecturer in English literature at Trinity College, Cambridge, and in 1903 he lectured at several institutions in the United States. In the latter year he was appointed Chairman of the Executive of Shakespeare's Birthplace Trust. Among his publications are: *Strafford-on-Avon from the Earliest Times to the Death of Shakespeare* (1885); *A Life of William Shakespeare* (1898, with subsequent editions); *A Life of Queen Victoria* (1902); *Shakespeare First Folio Facsimile, with Introduction and Census of Extant Copies* (1902); *Elizabethan Sonnets* (1904); *Great Englishmen of the 16th Century* (1904); *The French Renaissance in England* (1910); and *The Principles of Biography* (1911). He died 3rd March, 1926.

Leech, John, an English artist and humorist, born in London in 1817, died 1864. He was educated at Charterhouse, after which he studied at St. Bartholomew's Hospital for a time, but forsook medicine, and commenced drawing on wood for publications. His first important work was illustrations to the *Ingoldsby Legends*. In 1841 he joined the staff of *Punch*, his first drawing appearing in August of that year. For that periodical he worked with pre-eminent success, supplying weekly political satires and pictures of all phases of English life, showing no less artistic power than versatile humour, and marked by complete absence of the malice and coarseness often shown in the work of his predecessors. His designs for *Punch* have nearly all been republished as *Pictures of Life and Character*, and as *Pencilings from Punch*. He also executed the illustrations for *Mr. Spence's Sporting Tour*, *The Comic History of England*, and other books.—Cf. W. P. Frith, *John Leech and his Work*.

Leech, a name for those Annelida or segmented Worms that form the type of the ord. Hirudinea (synonyms, *Suctorii*, *Disco-phora*) of that class. The distinctive feature of the leeches consists in the presence of an anterior sucker surrounding the mouth, and, in most cases, of a posterior sucker as well. The rings or segments of the body are divided into numerous annuli.

Leeches usually breathe by the general surface of the body, but external gills are sometimes present. The sexes are united, and the eggs are usually deposited in little cases or cocoons. They chiefly inhabit freshwater ponds, though some live among moist vegetation, and some are marine. The familiar horse-leeches (*Hæmopsis gulo*) of freshwater ponds and ditches are included in this group. The land-leeches of Ceylon are terrestrial in habits, living amongst damp foliage and in like situations. They fasten on man and beast, and are a serious pest to travellers. The species generally employed for medical purposes belong to the genus *Hirudo*, and are usually either *H. officinalis* (the Hungarian or green leech), used in the south of Europe, or *H. medicinalis* (the brown-speckled or English leech), used in the north of Europe. The latter variety, however, is now rare in England, owing to the drainage of bogs and ponds. The mouth, situated in the middle of the anterior sucker, is provided with three small saw-edged jaws, capable of inflicting a peculiar Y-shaped wound, which is difficult to close, and permits a large and continuous flow of blood. Coagulation is prevented by a special secretion that exudes from the mouth. From 4 drachms to 1 oz. may be stated to be the average quantity of blood that can be drawn by a leech. After detaching themselves, leeches are made to disgorge the blood they have drawn by being placed in a weak solution of salt, or by having a little salt sprinkled over them. Leeches appear to hibernate, burying themselves in the mud at the bottom of the pools, and coming forth in the spring.

Leeds, a city and county borough and manufacturing town of England, in the West Riding of Yorkshire, on the River Aire, which becomes navigable at Leeds, and is crossed by eight bridges. The Leeds and Liverpool Canal, opened in 1816, communicates with the Aire, which again gives water communication with Hull. The canal is about 143 miles long, including branches, and runs through several important towns of Yorkshire and Lancashire. Among the public buildings are the town hall, a massive stone building of the Corinthian order; the infirmary, a building in the Gothic style; the Royal Exchange; the university buildings; and the Institute of Science, Art, and Literature. The chief educational institution is the university (chartered in 1904, previously the Yorkshire College), with faculties of arts, law, science, and technology, and a school of medicine. The charities and charitable institutions are numerous. Leeds possesses a large public park (Roundhay Park), besides Kirkstall Abbey and its grounds. Leeds has long been the chief seat of the woollen manufacture of Yorkshire. In the wholesale

clothing trade several thousand hands are employed, as also in steelworks, iron-foundries, rolling-mills, and tool and machine factories. The boot and shoe factories, the leather trade, and the cloth-cap trade also employ large numbers of men and women, and there are extensive colour-printing works, tobacco manufactories, chemical- and glass-works, works for making drainage pipes, fire-bricks, terra-cotta, and pottery. Many collieries are worked in the district. The history of Leeds extends over more than 1200 years, the town being mentioned under the name of *Loid* or *Loidis*, by the Venerable Bede, as the capital of a small British kingdom about 616. Its present charter is of date 1661. It became a parliamentary borough in 1832, with two members; in 1867 it got a third, in 1885 two more, and since 1918 it has had six. It is now a city, and its mayor is a 'lord mayor'. Pop. (1921), 458,320.

Leek (*Allium Porrum*), a mild kind of onion much cultivated for culinary purposes. The stem is rather tall, and the flowers are disposed in large compact balls, supported on purple peduncles. See *Allium*.

Leek, a market town of Staffordshire, England, picturesquely situated in the valley of the Churnet, 28 miles from Manchester. There are remains of an ancient abbey and the neighbourhood has furnished interesting relics of Roman and pre-Roman times. Pop. (1921), 17,213.

Leer (lär), a Prussian town in East Friesland, situated on the River Ieda, about a mile from where it enters the Ems. It has a good harbour, and is also a railway junction. Pop. 14,000.

Leet, or Court Leet, an old English court held periodically in a hundred, lordship, or manor, presided over by the steward of the leet, and attended by the residents of the district. In theory it was a royal court, and is thus to be distinguished from the 'court baron'. It began to lose its importance in the fourteenth century.

Leeuwarden (lä'u-vär-den), a town of Holland, capital of the province of Friesland, intersected by numerous canals. The principal buildings are the palace of the former Stadtholders of Friesland, several churches, town house, and provincial court-house. The industrial establishments are varied. Pop. (1919), 42,024.

Leeuwenhoek, Anthony van, born at Delft, Holland, in 1632, and died there in 1723. A pioneer observer in biology, he is said to have done most of his work with simple magnifying lenses, which he made himself. The blood capillaries, the red blood corpuscles, spermatozoa in animals, oak-galls, weevils, aphides on fruit-trees, fleas, ants, eels, and mussels were some of the subjects in which he made original dis-

coveries or of which he was the first to give accurate descriptions.

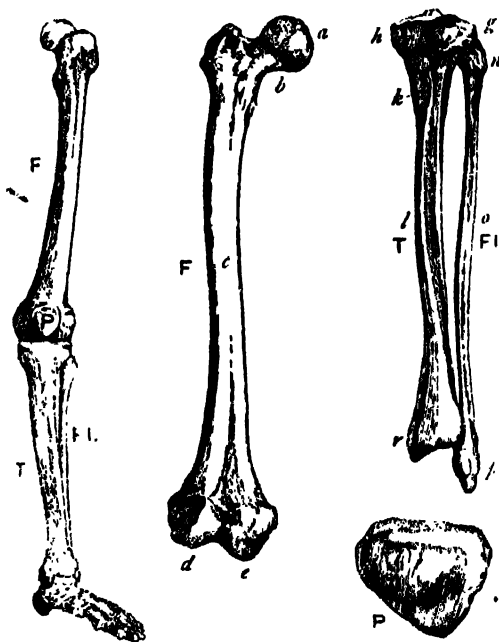
Leeward Islands, a double chain in the West Indies, forming, with the Windward Islands (q.v.), the Lesser Antilles (q.v.). The outer chain comprises Sombrero, Virgin Islands, Anguilla, Barbuda and Antigua, St. Bartholomew, Désirade and Marie Galante (French), and St. Martin. The inner chain comprises Dominica, St. Kitts, Nevis, Montserrat; the French islands, Guadeloupe and Martinique; and the Dutch, Saba and St. Eustatius. Total area, 715 sq. miles; pop. about 130,000. See *West Indies* and under various islands.

Leg, any limb of an animal that is used in supporting the body, and in walking and run-

Knee.) The lower end of the tibia and of the fibula take part in the formation of the ankle-joint, the weight being conducted to the foot by the tibia. (See *Foot*.) In the front are muscles which extend the foot, and on the back of the leg are two large muscles forming the bulk of the calf of the leg, which unite in a thick tendon, the *tendo Achillis*. These muscles are used in walking, jumping, &c.

Leg'acy, a gift of personal property by will. It is a general rule that if a legatee die in the lifetime of the testator, the legacy lapses and falls into the residue of the estate, unless when the legatee has been a child of the testator, and has left children. If it is of a particular thing, as a gold watch or so many shares in a particular company, it is *specific*; if of a sum of money to be paid out of the general estate, it is *general*; and if of a sum of money to be paid out of a particular fund, it is *demonstrative*. Legacy duty (q.v.) is payable on most legacies. If the testator after making the bequest of a specific legacy parts with the subject of it, the legacy is revoked or 'adeemed'. All legacies are postponed to the claims of creditors.

Legacy Duty is payable on gifts of personal or movable estate made by a testator domiciled in the United Kingdom, and on the distributive shares of such estate devolving under the intestacy of a person so domiciled. The rates vary according to the relationship to the testator or intestate, and are: 1 per cent in the case of husband or wife and lineal ascendants and descendants; 5 per cent in the case of brothers and sisters and their descendants and their wives or husbands; and 10 per cent in the case of all other relatives and strangers. The 1 per cent duty is not payable (1) where the principal value of the property passing on the death in respect of which estate duty has been paid does not exceed £15,000, and (2) where the amount or value of the legacy together with any other legacies derived by the same person from the testator or intestate does not exceed (a) £1000, or (b) if the person taking the legacy is the widow or child under twenty-one of the testator or intestate, £2000, whatever the principal value of the property may be. Exemptions from all legacy duties are *inter alia* objects of national interest, specific legacies under £20 in value, personal or movable estate not exceeding £100, and estates not exceeding £1000 net value (exclusive of property settled otherwise than by the will of the deceased) upon which estate duty has been paid. Furniture and other things not yielding income, given in life-rent, do not bear the duty until they pass in absolute ownership. The duty must be accounted for at the time of paying, delivering, retaining in trust (e.g. for an infant), or otherwise discharging the



Bones of the Human Leg and Thigh

F Femur: a, Head; b, Neck; c, Shaft; d, External condyle; e, Internal condyle. T, Tibia: f, Spinous process; g, Outer tuberosity; h, Inner tuberosity; i, Tubercle; l, Internal surface of shaft. Fl, Fibula: n, Upper extremity; o, Shaft; p, Lower extremity (external malleolus); r, Internal malleolus of Tibia. P, Patella.

ning; in a narrower sense that part of the human limb from the knee to the foot. The human leg has two bones, the inner called the *tibia* or shin-bone, the outer called the *fibula* or clasp-bone. The tibia is much the larger of the two, and above supports the thigh-bone at the knee-joint, the fibula being attached to the outer side of its head. In front of the knee-joint, situated within a tendon, is the knee-cap or *patella*. (See

legacy. It is borne by the legatee unless the will otherwise directs. See *Death Duties; Succession Duty*.

Legal Tender, that coinage which a debtor can compel a creditor to accept in payment of his debt. By the Coinage Act, 1870, it may be (a) gold to any amount, (b) silver to the extent of £2, (c) bronze to the extent of 1s., and also (d) for debts exceeding £5 Bank of England notes (except for payments by the bank and in Scotland and Ireland). Since 1914 the £1 and 10s. Treasury Notes, issued at first as an emergency war measure, are tender to any amount. Foreign coins are not valid tender in the United Kingdom, but United States gold coins are valid in Canada.

Legates, persons sent by the Pope as ambassadors to foreign courts. *Legatus a latere*, the highest in rank, were sent on particularly important missions, and were taken from the college of cardinals only. *Legatus* of lower ranks are the *legati missi*, and *legati nati*. The *legati missi* or nuncios correspond to ambassadors or ministers maintained by secular states at foreign capitals.

Legend (Lat. *legenda*, to be read, from *legere*, to read), originally the title of a book containing lessons read daily in the services of the early Church, and afterwards applied to collections of biographies of saints and martyrs or of traditional stories of them, because they were read in the refectories of cloisters and at matins. The Roman breviaries contain histories of the lives of saints and martyrs, which were read on the days of the saints whom they commemorated. Legends were presented in a tangible form in the twelfth or thirteenth century, and the best-known thirteenth-century work is probably *The Golden Legend* (Aurea Legenda), written by Jacobus de Voragine, Archbishop of Genoa (died 1298). The *Lives of the Saints* was known as *Legenda Sanctorum*, but the most comprehensive biographical works on the saints is that compiled by the Bollandists in the seventeenth and eighteenth centuries, the *Acta Sanctorum*. —BIBLIOGRAPHY: H. A. Guerber, *Myths and Legends of the Middle Ages*; L. J. A. Maury, *Croyances et légendes du moyen âge*; A. R. Hope Moncreiff, *Romance of Legend and Chivalry*.

Legendre (lə-zhān-dr), Adrien Marie, mathematician, born at Paris in 1752, died 10th Jan., 1833. Educated in the Collège Mazarin, he early became professor of mathematics in the École Militaire, Paris, and in 1783 a member of the Academy. In 1787 he was employed along with Cassini and Mechain to measure a degree of latitude between Dunkirk and Boulogne, while English mathematicians did the same on the other side of the Channel. His best-known work is his excellent *Éléments de Géométrie* (1794), a

substitute for Euclid which has been much used on the Continent. *Legendre's coefficients*, now called Zonal Harmonics, were introduced by him, and applied to the theory of attraction. He wrote a great work on Elliptic Functions, containing his own researches on Elliptic Integrals, as well as the later developments of Abel and Jacobi. He made discoveries of the first importance in the theory of numbers, and his treatise on the subject is a classic.

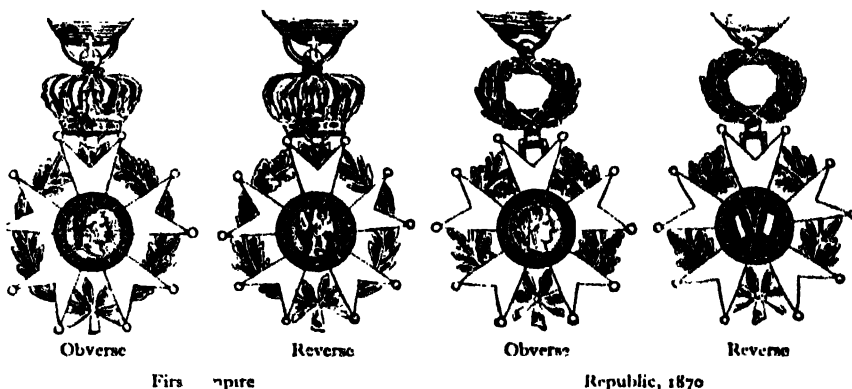
Leghorn (It. *Livorno*), a seaport of Northern Italy, capital of the province of Leghorn or Livorno. Leghorn is for the most part modern, and from a tiny place of about 700 inhabitants (sixteenth century) it has become the most important commercial town of Italy after Genoa, and contains the only naval college (Accademia Navale) of that country. It is intersected by canals, and a navigable canal connects it with the River Arno. Among objects of interest are the Duomo or Cathedral; the church of the Madonna; a synagogue richly ornamented with marbles; the English chapel and cemetery (containing Smollett's tomb); and the lazaretto, particularly San Leopoldo, one of the most magnificent works of the kind in Europe. The manufactures are varied. Shipbuilding is important, and trade is principally carried on with the ports of the Levant and with the United Kingdom, the exports being oils, silks, wines, hides, marble, and mercury. Leghorn was a mere fishing-village when it came into the possession of the Florentines in 1421, and it continued to be a place of no importance till the sixteenth century, when, in 1531, the Medici extended an invitation to all classes and creeds upon the Continent to settle in Livorno. The town was extended, fortified, and proclaimed a city in 1605. The Fort Vecchio still guards the entrance to the harbour. The harbour was commenced in 1586 and completed in 1621, when Livorno was declared a free port. The modern double harbour was completed in 1855, and is protected by a modern mole. There is a seventeenth-century cathedral with a façade designed by Inigo Jones. Pop. 108,585.

Leghorn fowl. See *Poultry*.

Legion (Lat. *legio*, from *legere*, to gather or collect), in ancient Roman armies a body of infantry consisting of different numbers of men at different periods, 3000 at first, 4200 under Servius Tullius, 6000 from the time of Marius onwards, and frequently with a small cavalry auxiliary. Each legion was divided into ten cohorts, each cohort into three maniples, and each manipulus into two centuries. Every legion had sixty centurions, and the same number of *optiones* or lieutenants and standard-bearers. The standard of the legion was a silver eagle, introduced by Marius.

Legion of Honour (*Légion d'Honneur*), a French order for the recognition of military and civil merit, instituted by Napoleon while he was First Consul, 19th May, 1802, and inaugurated 14th July, 1804. The decoration as worn by Napoleon consisted of a cross containing his portrait surrounded by a wreath of oak and laurel, surmounted by the imperial crown, and bearing the legend *Napoléon Empereur des Français*; on the reverse was the French eagle with a thunderbolt in his talons, and the legend *Honneur et Patrie*. The order has been remodelled upon several occasions, the last being subsequent to the downfall of the Second Empire, and the decoration now consists of a five-armed, ten-pointed cross, bearing a wreath of oak and

legislation and administration are separated, the former being allotted to elected representatives of the people, while the latter is carried out by a permanently appointed and paid staff of public servants. The element of popular representation distinguishes the modern democratic form of government from the monarchic or oligarchic absolutism of past ages. Under the absolute rule of a monarch or an oligarchy the difference between legislation and administration is not distinctive; the edicts of the ruler are in effect administrative rules, whether based on the advice of a council or issued spontaneously. The distinctive quality of legislation, as understood in modern times, has its genesis with its control by popular representatives. Under a



crowned by a laurel wreath, which is in turn connected with the cross by a red ribbon of watered silk. Upon the obverse side of the cross is borne a medallion inscribed with a figure emblematic of the Republic, and carrying the legend *République Française - 1870*; upon the reverse side are two flags (tricolour), and the legend *Honneur et Patrie*. The head of the Republic is Grand Master of the order, which is now divided into five classes, Grand Cross, Grand Officer, Commander, Officer, and Chevalier, the numbers of appointments in all cases being limited. During the European War several French and Belgian towns were decorated with the Legion of Honour; women are eligible for appointment, as are also foreigners.

Legislation is one of the two main elements in government. The legislator is the one who 'carries' laws (Lat. *legislator*, the bringer of the law). The legislature frames the laws of a country; the administration applies them. The latter function is divided between the judiciary and the executive, concerned respectively with the definition and the detailed application of legislation with reference to the daily life of society. In modern States the functions of

constitutional monarchy the framing of the laws is the work of the representatives of the people, but the act which creates new laws is the 'sanction' of the monarch. The same result is obtained negatively under a republic by the right of veto vested in its president. In practice the ruler's advisers usually initiate legislation; the draft law is considered and amended by one or two chambers of more or less real representatives of the people, and it then passes to the ruler for acceptance or rejection in its final form.

An important auxiliary of legislation is *codification*, or the drawing up of orderly systems of law. This may either be legislation pure and simple (i.e. the framing of fresh laws, but in an orderly and connected 'code'), as the Mosaic law or the codes of Solon and Draco, or the digesting of existing law, as the *codices* of Theodosian and Justinian, and, to come to our own day, the many Consolidating Acts of Parliament, or of common (unwritten) law, as the *Pandects* of Justinian. The *Code Napoléon* and the Prussian *Landrecht* were in large measure fresh legislation, though based on the existing French and Prussian law respectively. Codes such as the Mosaic and Draconian were no doubt

based on existing custom, their merit being the definition and stereotyping of it. This would be the main function performed in the law-giving of the Druids in Britain and the Brehons in Ireland.

The Roman emperors reduced the then existing legislative bodies, the Senate (or council of elders) and Comitia (assembly of the people), to a consultative capacity, and until the close of the Middle Ages legislation remained a function of the prince or ruler, uncontrolled by any popular representative body. The legislative power was the last to be acquired by the British Parliament, being preceded by the control over taxation and the right to impeach the king's ministers for misconduct. It was not until the nineteenth century that representative legislatures were secured in the European states; they were everywhere modelled closely on the British Parliament.

In some states, notably in Switzerland, Estonia, and in certain state Governments of the United States, the system of the Initiative and the Referendum is in force. Under this system legislation may be directly initiated by the people, and completed drafts of some or all laws must be submitted to popular vote (referendum) for sanction or veto, and must be submitted if a certain percentage of voters so demand. Draft legislation may be promoted by a petition with a prescribed minimum of signatures; this is Initiative. The petition, if not acceded to, must be referred to a popular vote, and if popular approval is thus manifested, the proposed law must be carried into effect by the legislative chamber.

The limits between legislation and administration vary a good deal in different countries. In Great Britain it is usual to draft Acts of Parliament in great detail, regulations issued under them being concerned mainly with the duties of the departments entrusted with their administration. In some of the European States, notably France, Germany, and Italy, laws are frequently promulgated in much more general terms, leaving wider scope to the administration in filling in details and even in supplementing the legislative provisions; always subject, however, to the right of the legislative bodies to amend or repeal the administrative ordinances. This method of legislation is open to abuse where the administration is not closely watched and controlled, but it saves the time of the legislative chambers, and ensures a greater flexibility, which is important in legislation dealing with complicated and changing social problems. Accordingly there was a strong move in this direction in British practice during the European War, since when, however, a reaction against 'Government by Bureaucracy' has set in.—*Cf. W. T. Brown, Underlying Principles of Legislation.*

Legislature, the authority in a state vested with the power of making laws. Such a body may be (a) sovereign, or (b) non-sovereign or subordinate. (a) The outstanding example of a sovereign legislature is the Parliament of the United Kingdom, which is both a legislative and a constituent assembly, i.e. the king in Parliament may make, alter, or repeal any law, whether affecting public or private rights or the Constitution, with equal facility, and cannot be limited or overruled by any person or body. In the words of Blackstone: "The power and jurisdiction of Parliament is so transcendent and absolute that it cannot be confined either for causes or persons within any bounds. . . . It hath sovereign and uncontrollable authority in the making, confirming, enlarging, restraining, abrogating, repealing, reviving, and expounding of laws, concerning matters of all possible denominations, ecclesiastical or temporal, civil, military, maritime, or criminal, this being the place where that absolute despotic power, which must in all Governments reside somewhere, is entrusted by the Constitution of these kingdoms. All mischiefs and grievances, operations, and remedies, that transcend the ordinary course of the laws are within the reach of this extraordinary tribunal. It can regulate or remodel the succession to the crown. . . . It can alter the established religion of the land. . . . It can change and create afresh even the Constitution of the kingdom and of Parliaments themselves. . . . It can, in short, do everything that is not naturally impossible. . . . True it is that what the Parliament doth, no authority on earth can undo." (b) A non-sovereign or subordinate legislature, on the other hand, is restricted in its legislative powers in some way, as by the existence of a Constitution from which it derives its authority and which it cannot change, or which it can change only by extraordinary difficulty; or by the existence of an independent authority which may pronounce its laws invalid or unconstitutional. Examples are the legislatures of France, Belgium, and other countries, and of the British Dominions, which have a high degree of sovereignty, and those local bodies with more limited powers (municipal corporations, railway companies, &c.) which are not ordinarily called legislatures. Thus the British Dominion Parliaments make and repeal laws, but they have no power to alter the Imperial Statutes which gave them their constitutions, nor is any Dominion Statute valid which conflicts with an Imperial Statute applying to that Dominion. Legally the Imperial Parliament can legislate for the Dominions, and the Crown can veto Dominion legislation. In the United States of America Congress may pass laws to which the courts will not give effect as

being in contravention of the Constitution. In a federal Constitution the legislative bodies of the individual states are necessarily non-sovereign bodies bound by the terms of the treaty which forms the federal Constitution. Of the law-making bodies not ordinarily termed legislatures, a railway company may be taken as an example. It can make by-laws regulating its affairs, e.g. conditions of travelling, but only within the limits of the Act constituting it and not repugnant to the general laws of the land.—BIBLIOGRAPHY: A. V. Dicey, *Law of the Constitution*; Sir C. P. Ilbert, *The Mechanics of Law Making*; Sir W. R. Anson, *Law and Custom of the Constitution*.

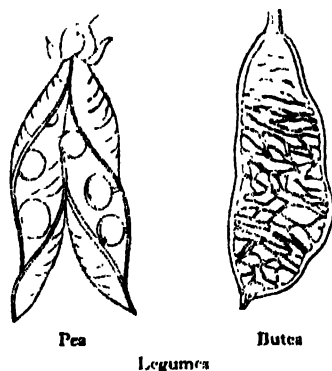
Legitim (lej'-), or **Bairn's Part**, in Scots law, the share of a father's movable property to which on his death his children are entitled. This amounts to one-third where the father has left a widow, and one-half where there is no widow. The legitim cannot be diminished or affected by any testamentary or other *mortis causa* deed. It may be discharged by ante-nuptial contract of the parents, or satisfied by a testamentary provision given and accepted in lieu of it. By a statute passed in 1881 legitim is also made payable out of the mother's movable estate.

Legitimation, the act whereby a bastard is made legitimate. Legitimation may be accomplished in three ways: (1) By subsequent marriage of the parents (*per subsequens matrimonium*), provided that at the date of the child's conception the parents were legally free to marry. This is the law in Scotland (and most other countries), but not in England. Its effect is to give the child so legitimated the status and rights of one fully born, and if thereafter there be a divorce on the marriage, he will be the child of the divorcee as such. But if an illegitimate child be legitimated before his parents marry, their subsequent marriage legitimates him only so far as regards his children's rights of succession. The test of legitimation is the domicile of the father. Should his domicile at the time of the marriage differ from his domicile at the date of the birth, the former (in the accepted view) determines the question. The place of birth and the place of marriage are of no importance. In England bastardy is indelible, but in Aug., 1921, a Bill altering the law and introducing legitimation *per subsequens matrimonium* passed its third reading (The Children of Unmarried Parents Bill). (2) By Letters of Legitimation from the king, which have the effect of legitimating a child only so far as succession to his parents is concerned, and only in default of lawful heirs, i.e. the Crown gives up its rights of succession in his favour. These are now seldom applied for. (3) By Act of Parliament. See *Illegitimacy*.

Legitimists (Lat. *legitimus*, legal, from *lex*, law), a French party which, after 1830, upheld the claims of the elder line of the Bourbons, to which Charles X belonged, against the younger or Orléanist line. The claims of the families of Bourbon and Orléans were eventually (1883) united in the person of the Comte de Paris. The name of legitimists is now applied to the believers in hereditary monarchy as opposed to parliamentary rule.

Legros (lé-grô), Alphonse, French artist, who worked mainly in England, born near Dijon in 1837, died in London 1911. Among his more important pictures are *The Anglers*, *The Pilgrimage*, *The Spanish Cloister*, *The Benediction of the Sea*, *The Baptism*, and *The Tinker*, this last being now in the Victoria and Albert Museum. His etchings (well represented in the British Museum) will prove in all probability his most enduring work, among the most noteworthy being his *Death and the Woodman* and *Le Repas des Pauvres*, both marked by breadth in conception and treatment. His portraits are also of considerable interest and value. As a teacher he exercised great influence. His work is marked by simple and direct technique, and sincere, rather severe handling; qualities which re-appear in many of his pupils.

Legumino'sæ, one of the largest and most important natural orders of plants, including



about seven thousand species, which are dispersed throughout the world. They are trees, shrubs, or herbs, differing widely in habit, with stipulate, alternate (rarely opposite), pinnate, digitately compound or simple leaves, and axillary or terminal one- or many-flowered peduncles of often showy flowers, which are succeeded by a leguminous fruit. Three sub-orders are recognized: Papilionaceæ, Casalpinieæ, and Mimoseæ. It contains a great variety of useful and beautiful species, as peas, beans, lentils, clover, lucern, sainfoin, vetches, indigo,

logwood, and many other dyeing plants, acacias, senna, tamarinds, &c.

Leh, the chief town of Ladakh province, Kashmir, in a fine open valley about 11,000 feet above sea-level, and 2 miles from the right bank of the Indus, 210 miles north of Simla. The Rajah's palace and several local temples are of very rich architecture. Leh is the great entrepôt for the traffic between the Punjab, Chinese Turkestan, and Lhasa, the population being about 3000.

Leibnitz (lîb'nîts), Gottfried Wilhelm, Baron von, German scholar and philosopher, born in 1646 at Leipzig, died in 1716. He studied law, mathematics, and philosophy at the university of his native town, where he published a philosophical dissertation, *De Principio Individui*, as early as 1663. This was followed by several legal treatises, for example, *De Conditionibus* (1665), and by a remarkable philosophico-mathematical treatise, *De Arte Combinatoria* (1666). After holding political appointments under the Elector of Mainz he went to Paris in 1672, and there applied himself particularly to mathematics. He also went to England, where he was elected a member of the Royal Society, and made the acquaintance of Boyle and Newton. About this time he made his discovery of the differential calculus. The Duke of Brunswick-Lüneburg then gave him the office of councillor and a pension, and after a further stay in Paris he returned to Hanover in 1676, and entered upon the superintendence of the library. For the rest of his life he served the Brunswick family, chiefly residing at Hanover, though visiting also Berlin, Vienna, &c. Being commissioned to write the history of the House of Brunswick-Lüneburg, Leibnitz went (1687) to Vienna, and thence to Italy. About this time he proposed a scheme to reunite Protestants and Catholics. Having assisted the Elector of Brandenburg (afterwards Frederick I of Prussia) to establish the Royal Academy of Sciences at Berlin, he was made president for life (1700). He was also made a Privy Councillor by Tsar Peter the Great. In 1710 he published his celebrated *Essai de Théodicée*, on the goodness of God, human liberty, and the origin of evil, in which he maintained the doctrines of pre-established harmony and optimism, and which was followed by his *Nouveaux Essais sur l'Entendement humain*. A sketch of his philosophy was given by him in his *Monadologie*, 1714. Severe attacks of gout, and his controversy with Newton concerning the discovery of the differential calculus, embittered the close of his active life. Although Leibnitz was eminent in various branches of knowledge, he is famous chiefly for his philosophical and mathematical achievements. Greatly influenced by the philosophy of Des-

cartes, he differed from the latter both in method and in some principles. The principal metaphysical speculations of Leibnitz are contained in his *Théodicée*, *Nouveaux Essais*, *Système nouveau de la Nature*, *De Ipsa Natura*, *Monadologie*, and in portions of his correspondence. He controverted Locke's rejection of innate ideas, holding that there are necessary truths which cannot be learned from experience, but are innate in the soul, not, indeed, actually forming objects of knowledge, but capable of being called forth by circumstances. For his theory of monads, see *Monad*. Authorities seem generally agreed that Leibnitz discovered the differential calculus independently of any knowledge of Newton's method of fluxions. — BIBLIOGRAPHY: J. F. Nourrisson, *La Philosophie de Leibnitz*; F. Kirchner, *G. W. Leibnitz*; B. A. W. Russell, *Critical Exposition of the Philosophy of Leibnitz*.

Leicester, Robert Dudley, Earl of, fifth son of John Dudley, Duke of Northumberland, born (circa) 1532, died 1588. In 1549 he was married to Amy Robsart, daughter of a Devonshire gentleman, and is said to have been accessory to her murder in 1560. He had been knighted by Edward VI, and Elizabeth created him Earl of Leicester and Privy Councillor, and bestowed titles and estates on him lavishly, but he excited the violent anger of the queen by his marriage with the Countess of Essex in 1578. He is characterized as an ambitious and unscrupulous courtier. The earldom lapsed with his death.

Leicester (les'ter), a city, municipal, parliamentary, and county borough of England, stands on the Soar near the centre of Leicestershire. The more important public buildings are the church of All Saints; St. Margaret's, a large and beautiful structure of the fifteenth century on the site of the old Saxon cathedral, and adjoining the abbey of St. Mary at which Cardinal Wolsey died in 1530; St. Martin's; St. Mary's, dating from twelfth century; St. Nicholas's, a very ancient Gothic church; the municipal buildings, with lofty clock-tower, and fine public square with fountain; the guild-hall, once the hall of a Corpus Christi guild, and town hall till 1876; the public library; and Trinity Hospital (1330). The staple manufactures are cotton and worsted hosiery, elastic webs, iron-ware, boots and shoes, shawls, lace, and thread. Leicester is a place of considerable antiquity, and was known to the Romans, who established a camp there in A.D. 50, under the name of *Rata Coritanorum*. The Saxon name was *Legerceastre*. It sends three members to Parliament. Pop. (c. bor.), (1921), 234,190.

Leicestershire, a county of England, in the Midlands; area, 532,779 acres. The surface is varied and uneven, but possesses no bold features. The county is nearly equally divided

geologically by the lias and sandstone formations; the former on the east, the latter on the west side. The coal formation exists to the extent of about 15 square miles on the west, and the clay-slate in Charnwood Forest (deforested), an elevated area where Bardon Hill rises some 900 feet. The principal rivers, all tributaries of the Trent, are the Soar, Wreak, Anker, Devon, and Mease. Dairy-farms are numerous, and Stilton cheese is extensively made. The Leicestershire sheep are much valued for their wool. The county returns four members to Parliament. Principal towns besides Leicester—Loughborough, Market-Harborough, Melton-Mowbray, and Hinckley, the first three being well-known centres of fox-hunting in England. Pop. (1921), 494,522.

Leigh, a town of England, county of Lancashire, 13 miles west of Manchester. It has manufactures of cottons, silks, glass, ironware, agricultural implements, &c., and near it are extensive collieries. Pop. 45,545.

Leighton (lā'ton), Frederick, Lord Leighton, painter, president of the Royal Academy, born at Scarborough in 1830, died in 1896. From Rome, where he spent some three winters, he sent to the Royal Academy of 1855 his picture of *Cimabue's Madonna carried in Procession through the Streets of Florence*, which was presented to the Scottish nation by King George V in 1922. For four subsequent years he resided at Paris, and then finally took up residence in London. In 1864 he was elected an associate of the Royal Academy, and in 1869 an Academician. In 1878 he succeeded Sir Francis Grant as president of the Academy, was knighted, and was named an officer of the Legion of Honour. In 1886 he was made a baronet, and on 1st Jan., 1896, he was made a peer. From the long list of his works special mention may be made of his *Hercules Wrestling with Death* (1871), *The Daphnephoria* (1876), *Phryne* (1882), *Cymon and Iphigenia* (1884), and *Ball Players* (1886); and the large frescoes at the South Kensington Museum, representing the *Industrial Arts applied to War, and the Arts of Peace*. In addition to his pictures he has achieved a high place as a sculptor by his *Athlete strangling a Python* (1876) and his *Sluggard* (1886). He also executed some black-and-white illustrations, notably to George Eliot's *Romola*. The special merit of his works lies in the correct though cold draughtsmanship and in its balanced, harmonious design. His colour, though not without charm, is never really satisfactory except in mural decorations. His great facility often caused his work to be superficial and empty.

Leighton, Robert, Archbishop of Glasgow, born in 1611, died in London 1684. On the attempt at the accession of Charles II to estab-

lish Episcopacy in Scotland, Leighton accepted reluctantly the bishopric of Dunblane, in the hope of moderating the violent dissensions of the time. He twice visited London (1665 and 1669) to implore the king to moderate the zeal of Sharpe and Lauderdale, and accepted translation to the archbishopric of Glasgow in 1669 after a promise of court assistance in the attempt to carry out a liberal measure for the comprehension of the Presbyterians. The promise being broken, he resigned his see (1674), and subsequently resided for the most part at his sister's estate in Sussex.

Leinster (lin'ster), a province of Ireland, divided into twelve counties—Wexford, Kilkenny, Carlow, Wicklow, Dublin, Kildare, Queen's County, King's County, Westmeath, Longford, Meath, and Louth; area, 7024 sq. miles. Leinster is the most favoured of the four provinces of Ireland in the extent of its tillage and pasture lands, and its wealth in minerals. Pop. 1,102,000.

Leipa, Böhmisch-Leipa, town of Czechoslovakia, in Bohemia; on the Polz. There are railway workshops and extensive manufactures. Pop. about 10000.

Leipoa (li-pō'a), a genus of gallinaceous birds of the family Megapodiidae, of which the only species is the *Leipoa ocellata* of the naturalists, the *ngow-oo* of the aboriginal Australian, and the 'native pheasant' or mallee bird of the colonists. The bird is a native of South and West Australia, is of the size of a very small turkey, and, like the Australian brush turkey, constructs mounds in which to lay its eggs.

Leipzig, a city of Saxony, important commercial centre and one of the greatest book-publishing, type-founding cities of Europe. It originated in Lipa (lime tree), a Wendish fishing-village of the tenth century, and is first mentioned as a town in 1015. Its pre-eminent position in the book trade dates from the seventeenth century. During the eighteenth century Leipzig was the focus of a literary movement under Gottsched, and it suffered greatly during the Napoleonic wars. A monument in the Johannisplatz commemorates the *Völkerschlacht* or 'battle of the nations', the German term for the battle of Leipzig, in which Napoleon was defeated (1813). In 1879 the *Reichsgericht*, supreme court of Imperial Germany, was established in a grandiose pile within the town, where a few German officers accused of violating the laws of war were tried in 1921. Leipzig possesses the largest railway station in Europe, and a university, founded in 1409. Until 1829 the *Königshaus* (seventeenth century) was the palace of the ruling Saxon princes. Three annual fairs have been held by the city since 1170, and, although much injured by modern

commercial progress, they are still unique as the Mecca of European bibliophiles. Pop. (1919), 604,380.

Leith (lèth), the port of Edinburgh, in the county of Midlothian, Scotland, about $1\frac{1}{2}$ miles from the centre of Edinburgh, on the south shore of the Firth of Forth, on both sides of the Water of Leith. It is connected with Edinburgh by Leith Walk and other lines of streets, and by branch lines of the railways centring in Edinburgh. Among the principal public buildings are the custom-house, exchange buildings, court-house, Trinity House, and the corn-exchange. The chief manufactures are ropes, sail-cloth, oil-cake, paints, colours, artificial manures, and there are shipbuilding-yards, iron-foundries, engine-works, flour-mills, oil-mills and refineries, steam sawmills, large maltings, and an ice-factory. The foreign trade is chiefly with the Baltic and the principal French, German, Dutch, and Belgian ports, with which there is a trade in grain and flour. There are extensive wet-docks, and several public graving-docks. Leith is mentioned for the first time, under the name of Inverleith, in a charter of David I granted in 1128. In 1806 Edinburgh promoted a Bill in Parliament for the inclusion of Leith. This Bill was rejected, but an amalgamation was effected in 1920. Pop. (on inclusion), 80,000.

Leltmeritz (lit'me-rits), a town of Bohemia, Czecho-Slovakia, situated on a height above the Elbe, is the see of a bishop, and contains a fine old cathedral. The industries are mainly connected with brewing. Pop. 15,400.

Leltrim (le'trim), a north-western county of Ireland, province of Connaught, about 51 miles long by 21 miles broad; area, 376,510 acres. Lough Allen, in the course of the Shannon, almost halves the county; the seaward half having a small coastal exit to Donegal Bay; the inland half being traversed by the Shannon and containing the county town, Carrick-on-Shannon. The surface, abounding in small lakes, is somewhat rugged and mountainous in the north, but elsewhere generally flat and in part moorish. In the valleys the soil, resting generally on limestone, is fertile. The principal crops are oats and potatoes. The minerals include iron, lead, and copper, all at one time worked, and coal, still raised to some extent. The county is served by the Midland Great Western Railway, and also by a shorter line. Pop. of county (1911), 63,582.

Leland, Charles Godfrey, American author, born at Philadelphia 1824, died in 1903. He studied law, but abandoned it for a literary life. He is best known through his quaint *Hans Breitmann Ballads* in Pennsylvania Dutch, and his works on the language and poetry of the gipsies.

Leland, or Laylonde, John, an English

antiquary, born in London about 1506, died in 1552. He was educated at St. Paul's School, and Christ's College, Cambridge, afterwards studying at Oxford and at Paris. On his return Henry VIII made him his chaplain and librarian, and gave him the title of Royal Antiquary. In 1533 he was empowered, by a commission under the great seal, to search for objects of antiquity in the archives and libraries of all cathedrals, abbey, or priories, and spent six years in travelling for this purpose. The great bulk of his collections was ultimately placed in the Bodleian Library in an undigested state. Hearne printed a considerable part, forming *The Itinerary of John Leland, and Lelandi Antiquarii de Rebus Britannicis Commentarii*. His collections have been sedulously mined by subsequent antiquaries.

Le'ly, Sir Peter, painter, born at Soest, in Westphalia, in 1617 or 1618, died in 1680. Lely or Le Lys was properly a nickname borne by his father, whose family name was Van der Voes. He was first instructed by Peter Grehber at Haarlem, but came to England in 1641, in the train of William, Prince of Orange, and commenced portrait-painting. He finished portraits both of Charles I and of Cromwell (the latter in the Pitti Gallery, Florence); but it was not until the Restoration that he rose to the height of his fame. His work satisfied the voluptuous taste of the new court, was in great favour with Charles II, who knighted him, and he painted the portraits of the fair and frail ladies of the court. The series of *Beauties*, originally eleven in number, but now reduced to nine, contains some of his best work. The collection is now at Hampton Court. Another well-known series is that of the *Flagmen*, twelve in number. The finest of Lely's few historical works is the *Susannah and the Elders*, at Burleigh House. — Cf. C. H. C. Baker, *Lely and the Stuart Painters*.

Lemberg (Pol. *Lwów*), a city of Poland (formerly in Austria), and capital of the district of Galicia. The town was founded in 1250, and was an important Polish city until 1772, when Galicia was annexed to Austria, Lemberg being made the provincial capital. In course of the European War the attention of all the High Commands was fixed upon Lemberg, and a series of the most tremendous battles in history was fought for its possession. Captured by the Russians under Russky (3rd Sept. 1914), Brusilov, the Russian generalissimo, held Lemberg until the great German offensive of 3rd June, 1915, which culminated in its evacuation and occupation by Mackensen on 22nd June. The Ukrainians captured the town in Oct., 1918, but were driven out by the Poles about a month later. Lemberg is an archbishopric (Roman Catholic), and has a university, founded in 1661. Formerly (under the Austrian régime) Austrian Poland was

governed by the Galician Diet, sitting at Lemberg and controlled from Vienna. Pop. (1910), 200,113.

Lemming, a rodent mammal very nearly allied to the voles. There are several species, found in Norway, Lapland, Siberia, and the northern parts of America. The most noted



Lemming (*Myodes lemmus*)

species is the common or European lemming (*Myodes lemmus*), of which the body colour is brownish variegated with black; the sides of the head and belly white, or of a greyish tint. The legs and tail are of a grey colour. The head is large and shortened, the body thick-set, and the limbs stout. It feeds on plants, and is exceedingly destructive to vegetables and crops. It burrows under the ground at a limited depth. It is very prolific, and vast hordes sometimes migrate towards the Atlantic and the Gulf of Bothnia, destroying all vegetation in their path. Great numbers of wild animals—bears, wolves, foxes—hang upon them in their march, making them their prey, thus tending to keep their numbers in some degree in check. The banded lemming (*Cuniculus torquatus*) is native to Siberia, Greenland, and North America.

Lemnian Earth, a kind of astringent medicinal earth, of a fatty consistence and reddish colour, used in the same cases as bole. It removes impurities like soap. It was originally found in Lemnos, but occurs also in Bohemia, Russia, and India, resulting from decay of felspathic rocks, like kaolin, to which it is related. Called also *Sphragide*.

Lemnos (*Stalimene*), the most northerly island of the Grecian Archipelago, between the Hellespont and Mount Athos, formerly in possession of the Turks, but occupied by the Greeks during the European War, and annexed by them at the conclusion of peace with Turkey. Lemnos formed between 1915 and March, 1916, a gigantic military and naval base for the combined French and British-European and native troops engaged in the campaign of Gallipoli. It has an area of

147 sq. miles. The principal town on the island is Kastro. Lemnos formerly contained a volcano, Mosychlus, which was regarded as the workshop of Hephaistos (Vulcan). Pop. 30,000.

Lemon, Mark, English journalist, humorist, and dramatic writer, born in London 30th Nov., 1809, died at Crawley, in Sussex, 23rd May, 1870. He made his first literary essays in the lighter drama, supplying the London stage with more than sixty pieces—farces, melodramas, and comedies. On the establishment of *Punch*, the first number of which appeared on 17th July, 1841, he became joint-editor with Henry Mayhew, and two years later sole editor.

Lem'on, the fruit of the lemon tree (*Citrus medica*, var. *Limonum*), originally brought from the tropical parts of Asia, but now cultivated very extensively in the south of Europe, especially in Sicily. It is of the same genus as the orange and citron, and differs little from the lime. It is a knotty-wooded tree of rather irregular growth, about 8 feet high; the leaves are oval, and contain scattered glands which are filled with a volatile oil. The shape of the fruit is oblong, and its internal structure is similar to that of the orange. The juice is acid and agreeable; and besides being used for beverages is employed by calico-printers to discharge colours. It also contains citric acid, sugar, albuminous and some mineral matter, nearly half of which consists of potash. The oil of lemon is a



Lemon (*Citrus medica*)

volatile oil of yellow or greenish colour got from the fresh rind of the lemon. It is used in perfumery, and in medicine as a stimulant and rubefacient.

Lemon-grass, an Indian grass (*Andropogon schenanthus*), remarkable for its fragrance, which resembles that of the lemon. From it is obtained grass-oil (q.v.).

Le'mur, a name popularly given to any member of the Lemuroidea, the lowest sub-order of the Primates, which also include monkeys, apes, and men. The chief family is that of the Lemnridae, among which the Lemnridae or True Lemurs are distinguished by their four-footed or quadrupedal mode of progression. The tail is elongated and furry, but is never prehensile. The hind-limbs are longer than the fore-limbs; the second toe in the hind-foot being long and claw-like, and the nails of all the other toes being flat. The fourth digit of the hand, and

creature with a squirrel-like tail and attenuated fingers. A third family, Tarsiidae, has been constituted for the little spectre lemur (*Tarsius spectrum*), which has large ears, enormous eyes, and suckers on the ends of its digits. All lemurs are arboreal, and their diet is of mixed kind.

Lemures, among the ancient Romans, synonymous with larva, spirits of the dead. To appease them, a ceremony of exorcism was observed on the nights of the 9th, 11th, and 13th May, when the father of the house threw black beans nine times over his head, thus securing one year's immunity from all evil spirits. The ceremony was called *Lemuria*.

Lena, a river of Siberia, one of the largest in the world, rising on the north-western side of the mountains which skirt the western shore of Lake Baikal, about 70 miles E.N.E. of Irkutsk. It flows in a winding course, and discharges itself through a delta into the Arctic Ocean. Its course, windings included, is about 2900 miles, and, with its tributaries, it has a drainage area of upwards of 900,000 sq. miles. Steamers ply on part of the river.

Lenin, Vladimir Ilyich Ulianov-Lenin (properly Vladimir Ulianov), the assumed name of the President of the Council of Peoples' Commissaries in the Russian Socialist Federal Soviet Republic, and the acknowledged leader of the Bolsheviks. He was born at Simbirsk in 1870, the son of a former Councillor of State and the scion of a noble house, but he early embraced the principles of Karl Marx, and was subsequently embittered against the autocracy by the execution of his brother in 1887 for conspiracy against the life of the Tsar Alexander III. Following a preliminary education at Simbirsk Gymnasium, he entered the University of Kazan, but was expelled for his participation in a students' political demonstration. In 1891 he studied law and economics in the University of St. Petersburg (Petrograd), and in 1895 he visited Germany. On his return he was arrested as a political conspirator, and was exiled to Sushenskoe, in Eastern Siberia, for three years. Released in 1900, he visited London in 1902, and resided abroad until 1905, when he was elected to the Second Duma during the 1905 Revolution, and edited *New Life*, the first Russian Socialist daily. However, the army refused to join the revolutionaries, autocracy triumphed, and Lenin was again exiled. In 1907 (London Congress) Lenin became leader of the *Bolsheviks*, Plekhanov directing the *Mensheviks*. Abroad he continued his revolutionary propaganda, and on the outbreak of the European War he was at Cracow, whence he was permitted to retire into Switzerland, where he directed the Revolutionary organization of Russia in concert with Plekhanov, the Menshevik, and founder of the



Lemurs

Left, Ring-tailed (*Lemur catta*). Right, Grey or broad-nosed (*Haplorhina griseus*)

especially of the foot, is longer than the others. The thumb can always be opposed to the other fingers, and has a broad, flattened nail. The ears are small and the eyes large. The incisor teeth are generally four, the canines two, and the molars twelve in each jaw. The true lemurs are exclusively confined to Madagascar and the Comoro Islands. Lemnridae also embrace: (1) Indrisinae, a Muscarene sub-family including the short-tailed *Indris brevicaudata* and other forms with disproportionately large hind-limbs; (2) Galagininæ, native to Africa and Madagascar, with large ears and long tails, as in Galago, which ranges over most of Africa; (3) Lorissinae, small Asiatic forms with very large eyes, and either tailless or with a very short tail. The Muscarene family Chiromyidae includes only the aye-aye (*Chiromys madagascariensis*), a small

Russian Social Democratic party, assisted in their labours by German gold. It is stated that Lenin had no partiality for the Germans, but was, and is, a single-minded fanatic, opposed to all Governments, and with no ideal but the substitution of the rule of the people for them. Upon the outbreak of Revolution in 1917 Lenin was transported from Switzerland to Petrograd by German connivance, and immediately inaugurated a crusade against France and Germany through his paper *Pravda* (The Truth). His attempt to overthrow the Kerensky Government ended disastrously, but he accomplished the political coup that paralysed diplomatic Europe on 7th Nov., 1917, when he established forthwith the rule of the *Soviets* (q.v.), described as 'the Dictatorship of the Proletariat'. His book *The State and Revolutions* appeared in Jan., 1920. He died Jan., 1924.

Lens, in optics, a transparent body usually of glass, with two surfaces ground and polished to shapes which are usually portions of spheres. Ordinary lenses are either convex or concave; convex lenses are thickest in the middle and cause rays of light to converge; concave lenses are thinnest in the middle and cause divergence of light. This action may be inferred from the fact that a ray of light which passes through a prism is bent or refracted towards the base of the prism. A lens may be regarded as built up of a series of prisms; in the convex lens the bases are towards the centre, and this lens bends the rays towards the centre; in the concave lens the bases of the prisms are towards the outside, and rays of light are bent by this lens

plano-convex, meniscus convex, and double concave, plano-concave, meniscus concave. Other

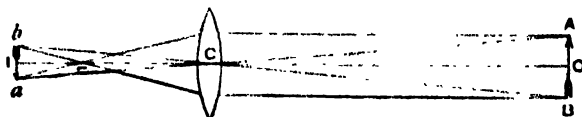


Fig. 1

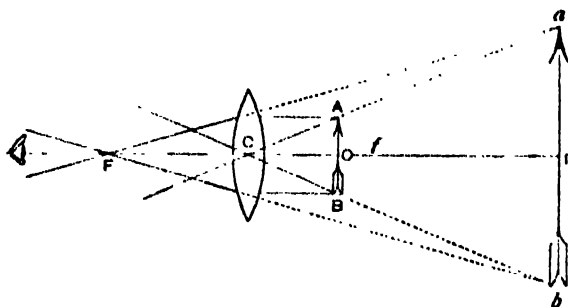


Fig. 2

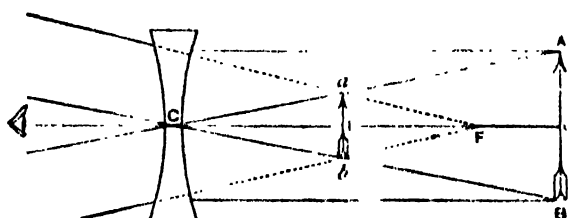
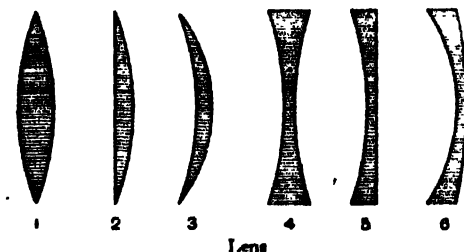


Fig. 3

Formation of Image by a Lens

Obj., Object. **atb**, Image—*a* being image of *A*, *b* of *B*, *t* of *O*. **C**, Optical centre. **F, f**, Foci. In each figure two rays from *A* are shown, before they enter and after they leave the lens. The lines of the emerging rays (produced backward if necessary, as shown by dotted lines) meet at *a*, the image of *A*; similarly with *b*, *t*. In fig. 1 the image is real and inverted. In fig. 2 it is virtual, erect, and enlarged. In fig. 3 it is virtual, erect, and diminished.



Converging: 1, Double convex; 2, Plano-convex; 3, meniscus convex. **Diverging:** 4, Double concave; 5, Plano-concave; 6, Meniscus concave.

away from the centre. With regard to shape, lenses may be further classified as double convex,

shapes are used for spectacle lenses, such as cylindrical, spherocylindrical, and toric surfaces, the last-named having different curvatures in two directions at right angles (compare the surface of an egg). Taking as an example the double convex lens, the straight line joining the centres of curvature of its surfaces is the *axis* of the lens, and the point on the axis through which rays may pass without ultimate change of direction is the *optical centre*. When rays parallel to the axis are incident on the lens, the emergent rays converge to pass through the *principal focus*, a point on the axis. There are two such points, one on each side of the lens, and the distance of either focus from the optical centre is the *focal length* of the lens. The *power* of the lens is the reciprocal of its focal length. When a luminous point is situated on the axis of a convex lens, rays spread out from the point,

and some of these pass through the lens, and, if convergent, form a point image on the axis. These two points are *conjugate foci*, and are interchangeable. When the luminous point is at a great distance from the lens, its image is at the principal focus. This is nearly realized when the lens is used to focus the sun's rays, and an image of the sun is formed close to the principal focus. The lens may be used in this way as a *burning-glass*. If the point object is moved along the axis towards the lens, the image moves along the axis away from the lens. In some forms of the photographic camera an expandible body is provided, so that the camera may be capable of focusing, on the ground-glass screen, images of objects at different distances from the lens. In the cases given, the image is real and inverted. When the object is at the principal focus, the image is infinitely distant. If the object is moved nearer to the lens than the principal focus, the image is formed on the same side of the lens as the object, and it is now virtual, erect, and enlarged. It is seen by looking through the lens, as is done when using a pocket lens as a simple microscope. The axis and optical centre of a concave lens may be defined as above; the principal focus is, however, virtual, and is that point from which the emergent rays appear to diverge, when rays parallel to the axis fall on the lens. The virtual image which is formed by a concave lens is erect, diminished, and nearer to the lens than the object. Additional information should be sought in textbooks of optics. See *Telescope*; *Microscope*; *Optical Lantern*; *Photography*; *Optics*.

Lens (lâns), a town of France, department of Pas-de-Calais, possesses iron- and steel-foundries and coal-mines, and manufactures steel cables. Here Condé defeated the Spaniards under Archduke Leopold in 1648. During the European War Lens was occupied by the Germans in Oct., 1914, and was not reoccupied by British troops until 3rd Oct., 1918. Pop. 31,740.

Lent, the forty days' fast in spring, beginning with Ash Wednesday and ending with Easter Sunday. It is called *quaresima* in Italian, and *carême* in French, from the Lat. *quadragesima* (fortieth). In the Latin Church Lent formerly lasted but thirty-six days; in the fifth century four days were added, in imitation of the forty days' fast of the Saviour, and this usage became general in the Western Church. The close of Lent is celebrated in Roman Catholic countries with great rejoicings, and the Carnival is held just before it begins. The English Church has retained Lent and many other fasts, but gives no directions respecting abstinence from food.

Lentibulariæ, a small natural order of gamopetalous dicotyledons, growing in water or in marshy places, sometimes epiphytes. The

flowers (often large and handsome) are usually yellow, violet, or blue. There are four genera, of which *Utricularia* (bladderwort) and *Pinguicula* (butterwort) are the best known. All are carnivorous.

Lenticels, ventilating pores which take the place of stomata (q.v.) on stems and other organs covered by cork or bark; well seen in ordinary bottle-cork (the powdery streaks) or twigs of elder.

Lentil (*Ervum lens*), a plant belonging to the papilionaceous division of the nat. ord. Leguminosæ, cultivated in Southern and Central



Lentil (*Ervum lens*)

Europe. It is an annual, rising with weak stalks about 18 inches, and with whitish flowers hanging from the axils of the leaves. Two varieties are cultivated—the large *garden lentil* and the common *field lentil*—the former distinguished by its size and the greater quantity of mealy substance which it will afford. The straw of lentils makes good fodder. As food for man the seeds are very nutritious, and in Egypt, Syria, &c., are a chief article of diet. In Great Britain their use as food is extending.

Lentini (Lat. *Leontini*), a town of Sicily, province of Syracuse. It has interesting ruins and a considerable trade. Pop. 19,000.

Lentiscus, or **Lentisk**, the mastich tree

(*Pistacia lentiscus*), a tree of the nat. ord. Anacardiaceæ, a native of Arabia, Persia, Syria, and the south of Europe. The wood is of a pale brown, and resinous and fragrant. See *Mastich*.

Leo, the Lion, the fifth sign of the zodiac, between Cancer and Virgo. The sun enters it about 23rd July, and leaves it about 23rd Aug. The constellation contains the first magnitude star Regulus, the well-known sickle-shaped group, and a number of double and variable stars. There is also a small constellation, called Leo Minor, lying between Leo and Ursa Major.

Leo I, St. Leo, called the *Great*, Pope, born about A.D. 390, died in 461. The Popes Celestine I and Sixtus III employed him in important ecclesiastical affairs, and on the death of Sixtus III in 440 he was elevated to the Pontifical throne. The beginning of his pontificate was marked by persecutions of all holding the Eunicean, Pelagian, Priscillian, and Eutychian heresies. He was employed by Valentinian to intercede for peace with Attila, who, at his request evacuated Italy. From the Vandal Genseric (455 A.D.), however, he was unable to obtain more than the promise to forbid the murder of the citizens, the burning of the city, and the plunder of the three principal churches in Rome. He is the first Pope whose writings have been preserved. In his main ambition to establish the supremacy of the Apostolic chair over the whole Christian Church he was defeated at the Council of Chalcedon (451), which affirmed the independence of the see of Constantinople.—Cf. C. H. Goren, *Leo the Great*.

Leo III, a Roman by birth, elected Pope on the death of Adrian I in A.D. 795. He commenced his rule by making submission to Charlemagne, so that when driven from Rome in 799 by his rival Paschal, Charlemagne re-established him on his throne, receiving from him in 800 the imperial crown. Leo died in 816.

Leo X, Giovanni de' Medici, second son of Lorenzo the Magnificent, born at Florence in 1475, died suddenly on 1st Dec., 1521. He received the tonsure in his seventh year, and was loaded with benefices. In 1488, when only thirteen years old, he was made a cardinal. Although only a deacon, he was chosen to succeed Julius in 1513. He made a favourable peace with Louis XII, who was compelled to abandon Italy, and public tranquillity being thus restored in the first year of his government, he gave all his attention to the promotion of literature and the arts. The university at Rome was restored and endowed, a society established for the publication of Greek authors, and great encouragement given to scholars. In 1516 Pope Leo issued the well-known Bull in which he defended the Papal authority in dispensing indulgences, and threatened all who maintained contrary doc-

trines with excommunication. Leo himself seems to have regarded the movement of the Reformation as of little importance, describing it as a squabble among the friars.—Cf. H. M. Vaughan, *The Medici Popes*.

Leo XIII, Vincenzo Gioacchino Pecci, Pope from 1878 to 1903, born at Carpineto on 2nd March, 1810, died 20th July, 1903. He received his early education at the Jesuit colleges at Viterbo and Rome, afterwards attending the schools of the Roman University to study canon and civil law. In 1837 he took holy orders, and in 1843 he was sent as nuncio to Belgium, being created at the same time titular Archibishop of Damietta. He became Bishop of Perugia in 1846, and seven years later was made cardinal by Pius IX. Having shown great activity as a cardinal, he was appointed in 1877 to the important office of Cardinal Camerlengo, and on the death of Pius IX in the following year he was elected Pope, assuming the title of Leo XIII. Although he worked hard for the restoration of the temporal power of the Papacy, considering the Italian Government as a usurper in Rome and himself a prisoner in the Vatican, his counsel was generally one of moderation, and in foreign politics he was especially successful as a conciliator. Thus in 1885 he was appointed arbitrator in a dispute between Germany and Spain with regard to the ownership of the Caroline Islands, and he also persuaded the French Catholics to support the Republic. In Ireland he condemned the 'Plan of Campaign', but generally allowed the Irish bishops a free hand in politics. One of the most important events during his rule was the celebrated struggle with Bismarck and the Prussian Government, known in Germany as the *Kulturkampf* (q.v.). The pontificate of Leo XIII is chiefly remarkable for the number of encyclicals issued. Among them may be mentioned that dealing with the condition of the working-classes, entitled *Rerum novarum* (1891), which was Socialistic in tone; another encyclical in 1896 pronounced against the validity of Anglican orders. He was succeeded by Cardinal Sarto as Pius X.

Leobuschütz (lä'op-shüts), a town of Upper Silesia, on the Zinna. Manufactures: woollen and linen cloth. Pop. 13,300.

Leon, a town of Spain, capital of the province and ancient kingdom of the same name. The principal buildings are the cathedral, a beautiful specimen of the purest Gothic; the church of San Isidoro, an ancient massive structure; and the fine old palace, La Casa de los Guzmanes. Pop. 18,000.

Leon, a province of Spain. It was formerly the Kingdom of Leon, a division of ancient Spain, now divided among Leon itself, Zamora, and Salamanca. Various grain crops and the

vine are cultivated. Area, 5036 sq. miles; pop. 307,000.

Leon, a city of Nicaragua, capital of the department of Leon, and formerly the State capital. The public buildings, which are considered among the finest in Central America, include a massive cathedral, an old episcopal palace, a new episcopal palace, and several churches. It is the seat of one of the three universities of Nicaragua, and also a bishopric (Roman Catholic). A railway connects it with the coast at Corinto. Pop. 38,818.

Leon, a town of Mexico, state of Guanajuato, on a fertile plain 6000 feet above sea-level, with flourishing industries of various kinds, and good railway connections. Pop. 57,722.

Leoncavallo, Ruggiero, Italian composer, a Neapolitan, born 1858, died 1919. He was educated at the Conservatoire in Naples, and his two-act opera *I Pagliacci*, first performed at Milan in 1892, was an unqualified success. It is still a great favourite in spite of its melodramatic plot. His operas *Medici* (1893), *Chatterton* (1896), *Zaza* (1900), *Der Roland von Berlin* (1904), *Maia* (1900), and *Malbrück* (1910) were not equally successful.

Leonforte, a walled town of Sicily, province of Catania. It carries on a considerable trade in corn, wine, and silk. Pop. 17,000.

Leonidas, in Greek history, a king of Sparta, who ascended the throne in 491 B.C. When Xerxes invaded Greece in 480 B.C., the Greek Congress sent Leonidas to defend the Pass of Thermopylae. His force, according to Herodotus, amounted to over 5000 men, of whom 300 were Spartans. After the Persians had made several vain attempts to force the pass, a Greek named Ephialtes betrayed to them a mountain path by which Hydarnes led a body of Persians to attack Leonidas in the rear. Leonidas and his followers fell after a desperate resistance (480 B.C.). A monument was erected to Leonidas on the spot where the Greeks made their last stand.

Le'onine Verse, a kind of Latin verse, in vogue in the Middle Ages, consisting of hexameters and pentameters, of which the final and middle syllables rhyme; so called from Leo or Leonius, a poet of the twelfth century, who made use of it, or, according to some, from Pope Leo II (A.D. 680). Traces, however, of leonine verse appear in the Roman poets. The following distich may serve as an example, being the Latin version of *The devil was sick*, &c.:

Demon languabat, monachus tunc esse volebat;
Ait ubi convalescit, manat ut ante fuit.

Leon'todon. See *Dandelion*; but dandelion is often put in a separate genus, *Taraxacum* (being called *T. officinale* or *T. densleonia*), certain allied plants being assigned to *Leontodon*.

Leopard, or **Panther** (*Felis pardus*), a carnivorous mammal inhabiting Africa, Persia, India, China, &c. The ground or general body-colour is a yellowish-fawn, which is slightly paler on the sides, and becomes white under the body. Upon this are black spots of various sizes, irregularly dispersed, a number of them being ring-shaped. Black individuals are not uncommon, especially in high lands. The African animal seems to have these ring-spots chiefly on the back, and to this form some would specially assign the name of leopard. It preys upon antelopes, monkeys, and the smaller quadrupeds, rarely molesting man unless itself attacked. It can ascend trees with great ease, often using them both for refuge and ambush. It is not



Leopard (*Felis pardus*)

infrequently trapped by means of pitfalls. The clouded leopard (*F. nebulosa*) of South-Eastern Asia is marked with dark stripes and blotches on a grey or tawny ground. The beautiful snow leopard or ounce (*F. uncia*), native to the highlands of Central Asia, resembles the common species as regards its spots, but these are larger and the ground colour is white.

Leopardi, Giacomo, Count, Italian poet and scholar, born at Recanati in 1798, died 1837. He was self-educated, and at an early age had written a *History of Astronomy*, and translated, with learned notes, *Porphyrus's Life of Plotinus*. His famous work *Operette Morali* appeared in 1827, and his celebrated poem *La Ginestra* (The Broom) in 1836. He lived at various times in Rome, Milan, Bologna, and Florence, almost constantly a victim of ill-health; in 1833 he removed to Naples, where he died.—**BIBLIOGRAPHY**: A. Bouché Leclercq, *Giacomo Leopardi: sa vie et ses œuvres*; W. M. Rossetti, *Studies in European Literature*; Sainte-Beuve, *Portraits contemporains* (Vol. iii).

Le'opold I, King of the Belgians, son of Francis, Duke of Saxe-Coburg-Gotha, was born at Coburg in 1790, and died in 1865. In 1816 he married Charlotte, daughter of George IV of Britain and heir-apparent, but she died the

following year (1817), and Leopold remained in England, being created Duke of Kendal. He married a daughter of Louis-Philippe of France; their son was afterwards Leopold II. In July, 1831 he accepted an invitation to become first King of the Belgians. He made a good king. His second son, Philip, Count of Flanders, was the father of Albert, reigning sovereign of Belgium during the European War.

Leopold II, King of the Belgians, was born at Brussels in 1835, died 1909. He became king in 1865. He founded the Congo Free State, primarily a private estate, but, upon a world-wide exposure of the atrocities committed in his name if not actually with his sanction, he surrendered his rights to the nation. In 1853 he married Marie (died 1902), daughter of Joseph, Archduke of Austria, by whom he had four children, one son (died 1869) and three daughters. He was a wise ruler, but was notorious for the looseness of his private life.—*Cf. A. S. Rappoport, Leopold II, King of the Belgians.*

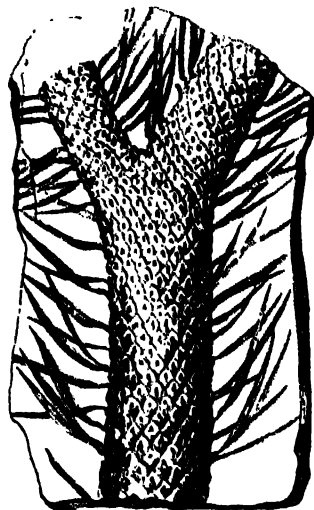
Lepanto, or **Epakto** (ancient **Naupactus**), a seaport town of Greece, in the nome of Phokis; on the Gulf of Corinth or Lepanto, near the Strait of Lepanto. It is memorable for the naval battle, from which dated the decline of the Turkish power in Europe, fought within the Gulf on 7th Oct., 1571, between the Ottoman fleet and the combined fleets of the Christian states of the Mediterranean (Spain, Vatican, Venice, Genoa) under Don John of Austria, when the former was destroyed.

Leper-houses, houses for the treatment of leprosy; once very numerous in England, nearly every important town having one or more of these houses. The house of Burton Lazars, in Leicestershire, built by Roger de Mowbray out of a general subscription raised over England in the time of King Stephen, was the head of all leper-houses in England. It was dependent on the leper-house at Jerusalem. From the Crusades until the Reformation these houses flourished and multiplied. Liberton, Edinburgh, was once, as the name implies, 'leper-town' of the locality, and many leper-colonies and posts are still in existence, including one in the United States, and another on Molokai, Hawaii. In the Appendix to Cleland's *Statistical Tables of Glasgow* there are two notices of the leper-house.

Lepid'ium, an extensive genus of herbs or undershrubs of the nat. ord. Cruciferae. *L. sativum* is the common garden-cress.

Lepidodendrea, a family of extinct (Palaeozoic) Lycopods. They are typically Carboniferous, but remains are known in Devonian strata. The plants resembled club-mosses in general structure, but were large trees, 100 feet or more in height. Many were heterosporous, and some had seed-like fructifications. The

familiar fossils known as *Stigmaria* represent the subterranean organs of *Lepidodendrea*.



Stem of *Lepidodendron*

Lepid'olite, a micaceous mineral allied to muscovite, and often of a delicate pink colour. In addition to potash, it contains lithia, which sometimes amounts to 10 per cent. Lepidolite is one of the minerals from which lithia is commercially extracted.

Lepidop'tera (Gr. *lepis*, a scale; *pteron*, a wing), the scientific name of the order of insects which includes the butterflies and moths (q.v.), and which is so named from the presence of innumerable small membranous scales, which come off like fine dust or powder when the wings (four in number) are touched by the finger. The scales are merely modifications of the hairs with which the wings of most other insects are covered; and from the presence of these scales the beautiful tints and colours of the lepidopterous insects are derived. The Butterflies form the *diurnal* Lepidoptera; whilst the Moths, flying about chiefly at twilight or during the night, are termed *crepuscular* or *nocturnal* Lepidoptera.

Lep'idus, M. *Æmilius*, Roman triumvir, prætor 49 B.C., consul with Julius Cæsar in 46, and in 44 appointed by Cæsar to the government of Narbonese Gaul and Nearer Spain. He was in Rome at the time of Cæsar's death, and joined Mark Antony. In 43 he united with Antony and Octavianus to form the triumvirate, obtaining Spain and Narbonese Gaul in the division of the empire. After the battle of Philippi (42) a re-division took place, in which Lepidus received Africa, where he remained till 36, when he was

summoned by Augustus to assist him against Sextus Pompey. He then tried to seize Sicily, but was overcome by Augustus, who deprived him of his triumvirate and banished him to Circeii. He died 13 B.C.

Lepismidæ, a family of minute wingless insects belonging to the ord. Thysanura, having the abdomen furnished at its extremity with three caudal bristles, which are used in leaping. The body is covered with minute scales. The common species (*Lepisma saccharina*) is found under wet planks, or in similar damp situations; also in brown sugar or farinaceous material. It is sometimes called the 'silver fish'.

Leprosy is a general disease which runs a very chronic course with acute intermissions. Although leprosy has been known since very early times, and has lately been the subject of much investigation, there is still much about it that is unknown. Its incubation period is indefinite; the germ causing it has not been successfully inoculated into animals; while the mode of infection and means of transmission from man to man are uncertain. It is in most cases slowly progressive, and only occasionally does it remain stationary under treatment.

Though the mode of infection is not definitely known, it is contagious from person to person, but only with close contact, and usually over a long period.

The spread of the disease is favoured by insanitary conditions and overcrowding, and though it may appear comparatively soon after possible infection, it is usually several years before it makes its appearance. It is more common among men than women, practically never seen in infancy, and most frequent in childhood, while it is rare to find it beginning after middle life. The first sign of the disease is the appearance of nodules in the skin, with fever and some general disturbance. These nodules are most common on the face, forearms, and thighs, but may appear on any part of the skin, and in time may become so numerous that the whole skin surface is involved. Hair does not grow on the surface of the nodule, hence the frequent loss of the eyebrows and eyelashes. The nodules may remain hard and fibrous, or break down and become ulcers. As the disease progresses it may affect the eyes, mouth, nose, and throat, with resulting marked deformity of the face.

Another form of the disease occurs where the nerves are affected, and with this type there is loss of sensation, shooting pains, twitching, and loss of the ordinary functions of the skin in the affected part. The nerves of the arm, leg, and face are most frequently attacked. This form of leprosy runs a longer course, and rarely itself causes the death of the patient, but with the

nodular type the leper lives, on an average, twenty years.

Prevention of the spread of the disease is only obtained by isolation of the leper, and with the establishment of properly controlled colonies the disease has declined.

Of the many remedies tried the best results have been obtained by the use of vegetable oils, either given by the mouth or by injection, but this is not a specific for the disease. No lasting results have followed the use of other remedies, or of the various serums, vaccines, and antitoxins that have been tried. General tonic treatment is indicated in all cases, and scrupulous cleanliness, by daily antiseptic baths in the case of sores and ulcers, help the patient and make his life more tolerable.

Leptite (Gr. *leptos*, delicate), a fine-grained granular metamorphic rock consisting mainly of quartz and felspar. Field-observation is often necessary to distinguish a leptite of sedimentary origin from a fine-grained igneous rock of the granitic series.

Leptosphaeria, a genus of Ascomycetous Fungi, group Pyrenomycetes. Several species cause diseases of cereals and forage plants.

Leptosporangiate Ferns, those in which the sporangia are small and delicate, each arising from a single superficial cell. The bulk of ordinary ferns belong to this section. Opposed to *Eusporangiate Ferns* (q.v.).

Lerici (lă'ri-ché), a seaport of Italy, in the province of Genoa, on the eastern shore of the Gulf of Spezzia. Pop. 9290.

Lerida (ancient *Ilerda*), a town of Spain, capital of the province of Lerida, Catalonia. As the key of Aragon and Catalonia it was early fortified, and still continues to be one of the most important military points of Spain. Pop. 22,000.

Lerida, a province of Spain, bounded on the north by France, has an area of 4690 sq. miles, and is traversed by ramifications of the Pyrenees. Pop. 292,423.

Lérins (lă-ran), *Îles de*, several small islands of France, attached to the department of Alpes-Maritimes, situated in the Mediterranean directly facing Cannes. The largest, St. Marguerite, is occupied by a prison, especially famous as the residence for twelve years of the Man in the Iron Mask (q.v.). The second, St. Honorat, contains the ruins of a once celebrated fourth-century monastery.

Lerma, Francisco Gomez de Sandoval y Rojas, Duke of, born about 1550, died in 1625. He was Spanish minister under Philip III from 1598 to 1618. His career was chiefly marked by the unfavourable terms on which he concluded peace with England (1604) and the United Provinces (1608); and by the decree of pro-

scription issued in 1609, which drove thousands of Moorish families from Spain and confiscated much of their property.

Lermontov, Mikhail Yuriévitch, Russian poet, born 1814, shot dead in a duel with a brother officer of the Life Guard Hussars, July, 1841. Among his best works are: *Walerik*, *Ismaïl-Bey*, and *A Hero of Our Time*.

Lernæ'idæ, a family of parasitic copepod crustaceans, in which the female is found attached to various marine fishes. The young lernæan as it first comes from the egg is provided with eyes, antennæ, and locomotive limbs. These persist in the relatively minute male, but the female becomes a shapeless mass bearing a pair of egg-sacs.

Lerwick (ler'wik), capital of the Shetland Islands, in Bressay Sound, on the south-eastern shore of Mainland. There are no manufactures of consequence but, favoured by the fine anchorage in the bay, the fishing industry thrives, herring being landed for curing in large quantities. Pop. 7736.

Le Sage, Alain René, French novelist and playwright, was born at Sarzeau, in Brittany, on the 13th Dec., 1688, and died on the 17th Nov., 1747. His father, who was a lawyer, died when Le Sage was fourteen, leaving him under the guardianship of an uncle, who contrived to dissipate most of his money. He was educated at the Jesuit school at Vannes, and went to Paris in 1692 to study law. He qualified as a barrister, but did not secure a lucrative practice, and his marriage, which took place in 1694, drove him to take up writing as a profession. About his plays not much need be said. Many of them are simply hack-work of the best kind, based upon the work of Spanish dramatists, especially Rojas and Lope de Vega. *Turcaret* is easily his best play; in it he imitated Molière, and showed himself no unworthy pupil. *Crispin rival de son maître* is another remarkable play, but in spite of these two triumphs it is as a novelist rather than as a dramatist that Le Sage is of world-wide importance.

As a novelist, too, Le Sage did much hack-work of a respectable but not important kind. Much of his work has a strong resemblance to that of Defoe. Among his minor novels may be mentioned *Robert Chevalier de Beauchêne*, the life of a buccaneer, whose widow, so he said, furnished the memoirs; and *Estévanille Gonzales*. The two works, however, upon which the reputation of Le Sage rests are *Le Diable Boiteux* and *Gil Blas*.

Le Diable Boiteux (The Devil on Two Sticks) appeared originally in 1707, but was revised and considerably enlarged in 1725. It borrowed its name, and the scheme and some of the language of its opening chapters, from the *Diablo*

Cojuelo of Guevara. It is, however, essentially original, and is an amusing satire on contemporary Parisian life. Le Sage seems to have needed always to borrow a certain amount of groundwork for his writings, but once he made a start, he wrote in a highly original manner. Le Sage's masterpiece, however, is his picaresque novel *Gil Blas*. The first two parts of it appeared in 1715, the third in 1724, and the fourth in 1735. *Gil Blas* is the crowning glory of the rogue-novel; it is a crystallization of all the best features in the work of Le Sage's Spanish predecessors. It is realistic, but not excessively so; the author would seem to have been one of the first to write with a map in front of him. It is full of satirical humour, as well as of bustling pictures of life. It deals with low life, but is never indecent. As Scott says of Le Sage: "His muse moved with an unpolluted step, even where the path was somewhat miry". The sardonic Spanish satirist Isla (q.v.) propounded in jest the theory that *Gil Blas* was stolen from Spain, and merely translated by Le Sage. Isla's jest was taken seriously by several scholars (men of the same type as those who thought that Homer was the real author of the *Battle of the Frogs and Mice*). The Comte de Neufchâteau took up the matter ardently, and an article in *Blackwood* (1844) supported this paradoxical contention. There is no truth in this theory, or in a similar theory propounded by Voltaire in a fit of pique that the novel was entirely taken from *La Vida de lo Escudero Don Marcos d'Obrego*. Le Sage certainly borrowed freely from Spanish picaresque novels; but all that gave his work its unique value was his own.

For the writer of the world's greatest rogue-novel, Le Sage seems to have lived a singularly innocent and domesticated life. He was devoted to his wife and family, and was devotedly loved by them in return. He was born a Breton, and did not lose his Breton characteristics during his sojourn at Paris. He remained fearlessly proud and independent. His Celtic nature also showed itself in the lack of arrangement and order in his novel. In literary history Le Sage occupies a peculiar position. His predecessors were all Spanish, and his successors English, Smollett and Fielding being the most famous. And yet he may perhaps be considered to rank after Molière as the most versatile of the great French writers. BIBLIOGRAPHY: Leo Claretie, *Le Sage, romancier*; G. E. B. Saintsbury, *Essay on French Novelists*.

Lesbos, a Greek island of the Ægean group, now called *Mytilene*, from its capital. In shape it is nearly triangular; has an area of 675 sq. miles, and a population of about 182,167. It belonged to Turkey from 1462 to 1912. It is mountainous, but is exceedingly fertile, its principal products

being figs, grapes, olive-oil, and pine timber. The island was famous in ancient times as a centre of Greek life and civilization. It formerly contained nine cities, the chief being Mytilene.

Lesghians, a Tartar people of the Mahomedan religion, inhabiting Daghestan, in the East Caucasus. They were among the most stubborn of the Caucasian peoples in their resistance to the Russians, one of their chiefs, Shamyl, having held out for over twenty years.

Lesina, an island in the Adriatic, on the coast of Dalmatia, stretching east to west for 40 miles, with a breadth of 2 to 6 miles, and presenting a continuous chain of hills, which, on the coast, form lofty and precipitous cliffs. Wine, olive-oil, and fruit are produced. The principal town, of the same name, is on the south-west coast, and has a good natural harbour. It was formerly Austrian, but now belongs to Yugo-Slavia. Pop. 14,000.

Leslie, Alexander, Earl of Leven, Scottish general, born about the end of the sixteenth century, died in 1661. He went abroad, and rose to be field-marshal in the service of Gustavus Adolphus. Returning home in 1639, he was chosen general-in-chief of the Covenanters' army, and defeated the king's army at Newburn. In 1644 he went to the assistance of the English Parliament, and led a division at Marston Moor. In 1646 Charles I gave himself up to Leslie's army, then encamped at Newark. At the battle of Dunbar he served as a volunteer, and was soon afterwards thrown into the Tower by Cromwell, but was liberated at the intercession of Christina of Sweden. The peerage of Leven is now merged in that of Melville.

Leslie, Charles Robert, painter, born in London in 1794, died in 1859. As a youth he was taken by his parents to the United States, and apprenticed to a bookseller in Philadelphia. Having shown artistic ability, he was sent to England, and became a pupil at the Royal Academy about 1813. Among his most successful early pictures were *Anne Page and Skender* (1819) and *Sir Roger de Coverley in Church* (1820). He was elected an associate of the Academy in 1821, and an Academician in 1826. From 1848 to 1851 he was professor of painting at the Academy. His *Life of Constable* is the chief authority for the life of that painter. The interest of his work is chiefly literary and historical.

Leslie, David, Lord Newark, a Scottish general and Presbyterian leader, born in Fife-shire in the early part of the seventeenth century (about 1601), died in 1682. He served under Gustavus Adolphus, and became a colonel in the Swedish army, but returned to Scotland at the commencement of the Civil Wars, and in 1644 accompanied the Earl of Leven with the Scottish

force sent to assist the Parliament. His Scottish horse supported Cromwell's decisive charge at Marston Moor. Leslie was then recalled to check the successes of Montrose in the north, and routed him at Philiphaugh, near Selkirk. With the change in Scottish politics the Scottish army returned home, and Leslie was employed for some time in putting down insurrection, chiefly in the north and west among the Highlanders. When, however, the Scottish Parliament took up arms on behalf of Charles II, Leslie was appointed commander-in-chief, and proved himself no unworthy opponent of Cromwell, but was finally defeated at Dunbar in 1650. He afterwards retreated to Stirling, where he was joined by Charles II, who assumed the command of the army. After the battle of Worcester Leslie was captured in Yorkshire, and imprisoned in the Tower till the Restoration. In 1661 he was rewarded for his services to the royal cause with the title of Lord Newark, and a pension of £500. The title has been extinct since 1790.

Leslie, John, Bishop of Ross, prelate and diplomatist, born at Kingussie 29th Sept., 1527, died in a monastery near Brussels in 1596. He studied at Aberdeen, Toulouse, Poitiers, and Paris, and escorted Queen Mary from France in 1561 as one of her most active friends and a pillar of Roman Catholicism. For his intrigues on her behalf he was imprisoned in the Tower in 1571, and on his liberation in 1573 he went to France, where in 1593 he was made Bishop of Coutances.

Leslie, Sir John, Scottish physicist and mathematician, born at Largo, Fife, 16th April, 1766, died in 1832. He studied at the University of St. Andrews, and then at Edinburgh. After a short stay in America he returned to London, where he commenced his translation of Buffon's *Natural History of Birds*, published in 1793. He invented the differential thermometer and a hygrometer about the year 1800, and four years later published his *Essay on the Nature and Propagation of Heat*. His works include: *Philosophy of Arithmetic* (1821) and *Rudiments of Geometry* (1828).

Lesseps, Ferdinand, Vicomte de, French diplomatist and engineer, born in 1803, died in 1894. After holding several consular and diplomatic posts he retired from the Government service, and in 1854 went to Egypt, and proposed to the Viceroy the cutting of a canal across the Isthmus of Suez. This great work was successfully accomplished during 1859-69, under his supervision. He subsequently proposed several other grandiose schemes; but the only one really taken in hand was the Panama Canal (q.v.).

Lesser Antilles, or Caribbees, West Indian island chain comprising the Leeward and Windward Islands; extending southwards from the

Virgin Islands to Trinidad and the Venezuelan seaboard.

Lessing, Gotthold Ephraim, German critic, dramatist, and savant, born in 1729 at Kamentz, Saxony, died in 1781. He entered the University of Leipzig in 1746 to study theology, but his love of the drama and his intimacy with Schlegel, Mylius, Weisse, and other young men of literary tastes led him to abandon this intention. After a short stay in Wittenberg he accompanied Mylius to Berlin (1748), where he wrote for magazines and booksellers. He undertook, with Mylius, in 1750, a publication entitled *Beiträge zur Historie und Aufnahme des Theaters* (Contributions to the History and Improvement of the Theatre); published some poems under the title of *Kleinigkeiten* (Trifles); translated a work of the Spanish philosopher Huarte; and wrote some articles in *Voss's Gazette*. He entered at this time into friendly relations with Moses Mendelssohn and the bookseller Nicolai, in conjunction with whom he established the critical journal *Briefe die neueste Literatur betreffend* (Letters on the Newest Literature). In 1755 appeared *Miss Sara Sampson*, a tragedy dealing with English life. In 1760 Lessing became secretary to General Tauenzien in Breslau for five years, when he returned to Berlin and published the *Laokoon, oder über die Grenzen der Malerei und Poesie*, and his comedy *Minna von Barnhelm*. The *Laokoon* attempts to define the demarcation and the limits of poetry and painting. It gradually revolutionized literary taste in Germany. In 1766 he became director of the National Theatre at Hamburg. While there he wrote his *Dramaturgie*. His criticisms made him enemies, and, compelled to quit Hamburg, the Duke of Brunswick appointed him his librarian at Wolfenbüttel. In 1775 he went to Vienna and accompanied Prince Leopold of Brunswick to Italy. He married in 1776, but his wife died a year later. At his period he was involved in fierce theological disputes, which his philosophical drama *Nathan der Weise* (1779) did nothing to allay. Besides those mentioned, he wrote another drama, *Emilia Galotti* (1772). Lessing's great aim as a writer, and particularly as a critic, was to struggle against the servility to French taste which at that time debased German literature and deprived it of originality. In this struggle he was successful; but it involved him sometimes in exaggerations, and exposed him, as well as his theological quarrels, to asperities which a less energetic writer would have avoided. By his plays Lessing gave Germany a national drama, and by his criticism he established for his nation true canons of aesthetic and dramatic criticism. — BIOGRAPHY: K. Goedeke, *Grundriss zur Geschichte der deutschen Dichtung*; E. Schmidt, *Lessing's*

Geschichte seines Lebens und seiner Schriften; H. Zimmern, *Lessing's Life and Works*.

Lessonia, a genus of Brown Algae, family Laminariaceae. The plants are tree-like, with stalks as thick as a man's thigh, and form veritable submarine forests.

Le Sueur (le-su-er), Eustache, French painter, born in 1617, died in 1655. His first works are in the style of his master, Vouet, and quite distinct from his subsequent ones. His great work was the series of paintings which he executed for the Carthusian monastery in Paris during 1645-8, delineating in twenty-two pictures the principal scenes in the life of St. Bruno. In 1650 he painted for the Corporation of Goldsmiths the *Preaching of the Apostle Paul at Ephesus*. All of these are large paintings, and are now in the Louvre. He was one of the twelve foundation members of the Academy. He was assisted in many of his works by his brothers, Pierre, Philippe, and Antoine.

Lethargy, an unnatural tendency to sleep, closely connected with languor and debility, or the result of some specific infection, such as that of sleeping sickness due to an organism (trypanosome) conveyed by the African tsetse fly, or of sleepy sickness (*encephalitis lethargica*). Simple lethargy may arise from a plethoric habit, from deficient circulation in the brain, from nervous exhaustion of that organ, from a poisoned state of the blood, or from a suppression of urine. When it is the consequence of alcoholic intoxication, or of the action of narcotics, it should be treated as apoplexy.

Lethe (lê-thê; Gr. *lêthê*, forgetfulness), the River of Oblivion, one of the streams of the lower regions celebrated in ancient mythology, whose water had the power of making those who drank of it forget the whole of their former existence. Souls before passing into Elysium drank to forget their earthly sorrows; souls returning to the upper world drank to forget the pleasures of Elysium.

Letters of Credit are mandates, giving authority to the person addressed to pay money or furnish goods on the credit of the writer. They are of two classes—'general', when not directed to a particular person, but intended to be acted upon by anyone, and 'special', when directed to a person named. A general letter of credit entitles anyone who gives credit to the party named therein and who complies strictly with its terms to recover full payment from the writer. The terms generally relate to the extent of the credit and the time and mode of giving it. Special letters of credit are chiefly issued by bankers and addressed to their foreign correspondents. Such addressees alone acquire any rights of action against the authors of the letters in respect of payments made thereunder. These

letters are not generally issued until money or securities have been deposited with the issuing house.

Letters of Marque (Fr. *lettres de marque*, commissions to plunder), commissions granted by a Government to private individuals authorizing them to wage war at sea on the ships and goods of a hostile state. Vessels so commissioned were termed privateers. The practice was abolished by the Treaty of Paris, 1856.

Letts, a Slavonic people closely akin to the Lithuanians, inhabiting until 1918 several Russian provinces, namely Courland, Livonia, Vitebsk and Kovno, and also the Kurische Nehrung in Prussia. There are also colonies of Letts in the Caucasus, in Canada, in the United States, and in Brazil. The Letts now form the dominant element of the Baltic Republic of Latvia. They came from the Niemen basin, were driven north by the Slavs, and subsequently subjugated by the Teutonic Order. They are tall and robust, but shy, patient, and submissive. They are frank and hospitable. Their dialect, together with the Lithuanian, and Borussia or Old Prussian, forms the Lettic branch of the Indo-European family of languages. The Letts number about 2,000,000. See *Latvia*.—Cf. H. Simson, *La Lettonie*.

Lettuce (*Lactuca sativa*), a smooth, herbaceous, annual plant, containing a milky juice, and in general use as a salad. The stem grows to the height of about 2 feet, and bears small pale-yellow flowers; the inferior leaves are sessile, and undulate on the margin. The young plant only is eaten, as the lettuce is narcotic and poisonous when in flower. A number of species are known from various parts of the globe. *Lactucarium*, or lettuce opium, the inspissated juice of the lettuce, is used medicinally as an anodyne.

Leuca'dia, or **Santa Maura**, one of the Ionian Islands, on the west coast of Greece. Its surface is mountainous and rugged. The eastern side is waste and barren, but the western and northern parts are very productive, yielding vines, olives, and citrons. The south-western extremity, now Cape Dukato (also known as the Leucadian Rock, or the Lover's Leap), is a white cliff rising to the height of at least 2000 feet. On its summit was a temple of Apollo, in whose honour a criminal was annually thrown from the rock into the sea as a sin-offering. Suppho, Artemisia, Queen of Halicarnassus, and other despairing lovers are said to have thrown themselves from it. Amaxichi (Leykas), pop. 5500, is the chief town. Pop. of the island, 29,471.

Leuchtenberg (loik'ten-berh), in the Middle Ages an independent landgraviate of Germany, which, by the extinction of the male line, fell to

Bavaria in 1646. From it Eugène Beauharnais took the title of Duke of Leuchtenberg.

Leucip'pus, Greek philosopher, founder of the atomic school, lived about 500 B.C., and is said by some to have been a native of Abdera; by others, of Elis or the Island of Melos. His instructor was Zeno the Eleatic, or according to others, Parmenides, and he himself was the teacher of Democritus. Whilst the more ancient Eleatics reduced all that exists to a single, eternal, and immutable substance, Leucippus, on the contrary, assumed an infinite number of particles of matter too minute to be perceptible to the senses, and in themselves indivisible. These atoms move from eternity in infinite space, and by their union and separation form the origin and end of things.—Cf. Th. Gomperz, *Greek Thinkers*.

Leucite, a mineral silicate of aluminium and potassium, usually with a little sodium, the potash content in varieties free from sodium being as high as 21.5. The crystals are commonly white and almost opaque, and are bounded by the twenty-four deltoidal faces of the cubic form known as the icositetrahedron. At and above 500° C. the form has true cubic symmetry and the optical characters of the mineral confirm this; but leucite is developed in volcanic lavas, and the crystals fail to maintain their high symmetry during cooling. Though not widely diffused, leucite is abundant in certain areas, such as the country near Rome and Naples and the Eifel. Leucitic rocks, on account of their high percentage of potash and the greater solubility of leucite in acids as compared with orthoclase feldspar, have been ground up as agricultural fertilizers. The mineral is regarded as economically important in the rich soils of Campania.

Leucobryum, a genus of mosses, growing in much the same situations as *Sphagnum*, and absorbing water in similar fashion.

Leucocythe'mia, or **Leukocythemia**, is the term used to describe the condition of the blood when there is a great increase in the white corpuscles. Associated with this condition there is enlargement of the lymphatic glands.

Leuco'jum, or **Leucolum**, a genus of European bulbous plants, nat. ord. *Amaryllicææ*. They are very like snowdrops, but the six perianth-segments are nearly equal. *L. cristatum* is a British species commonly known by the name of snowflake.

Leucoplast. See *Chromatophore*.

Leuctra, a village in Bœotia, on the road from Thebes to Plataea, famous for the victory of the Theban Epaminondas over the Spartan king Cleombrotus, which put an end to the Spartan domination in Greece (371 B.C.).

Leuk (loik), a town of Switzerland, canton of Valais, on the Rhone. About 5 miles to the

north are the celebrated thermal saline baths of Leuk (Leukerbad), 4500 feet above the sea, which annually attract large numbers of visitors, mainly Swiss and French, and which are used chiefly for cutaneous diseases.

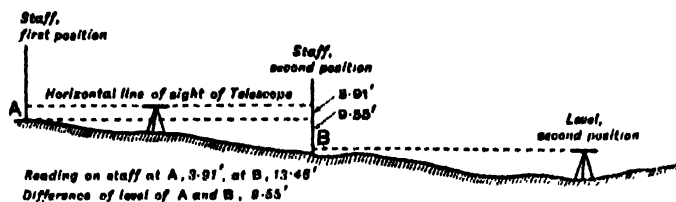
Levant, a term applied in the widest sense to all the regions eastward from Italy as far as the Euphrates and the Nile, and in a more contracted sense to the Asiatic coasts of the Mediterranean and the adjacent countries from Constantinople to Alexandria in Egypt.

Levee, a type of dike or embankment (q.v.), naturally formed, which contracts the channel of a river and protects the adjacent country. A deposit of sediment carried by a stream takes place whenever there is a reduction in velocity, and thus a river's bed rises, even above the surrounding plain, but as the deposit is always greatest at the sides where the velocity is least, the levee rises faster than the bed. Excessive floods cover the levees or burst through them. Such actions, causing great damage, occurred in 1800 on the Mississippi near New Orleans, and they are frequent on the Hoang-ho in China.

Levellers, a name particularly applied to a party which arose in the army of the Long Parliament about the year 1647, and was put down by Fairfax. They aimed at the establishment of an equality in titles and estates throughout the kingdom, and were led by John Lilburne. In 1649 the ringleaders were arrested for treason, and eventually the movement was suppressed.

Levelling is the operation by which the heights of points on the ground relative to each other are

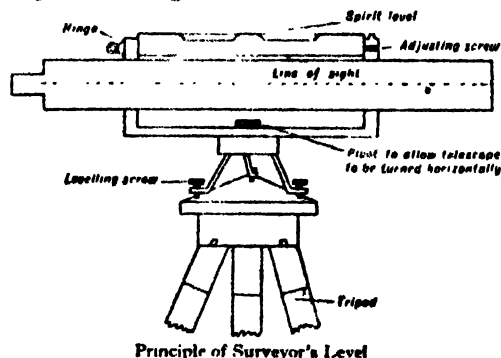
spider lines, which serve to fix a point in that plane. The straight line joining this point and the distant point whose image, as formed by the object glass, coincides with it is the optic axis of the telescope. If the instrument is properly adjusted, this axis is truly horizontal when the bubble is at the centre of its run. In running a line of levelling the observer obtains a horizontal sight upon a graduated staff placed upright upon a firm point, and held in that position by an assistant. The difference between two such readings obtained upon the staff when placed on two different points is the difference in height between the points. For convenience,



Method of using the Levelling Staff

and for the sake of the increased accuracy which results when the two level sights are taken in quick succession, it is customary to use two graduated staves instead of one. These staves are carefully compared with each other and with a standard. The best staves for precise levelling now consist of a painted strip of the nickel-steel alloy known as 'invar' let into a wooden casing. Formerly some hard wood, such as teak, was employed, and is still used for levelling of secondary importance. If a line of levelling return by a circuitous route to its starting-point, a check on its accuracy is obtained, for the total change of height observed should be zero. For this reason it is the rule to execute important levelling operations, such as the primary levelling of a country, in the form of a network. Numerous checks are then provided, and the whole can be computed by rigorous mathematical methods to give the most probable values of the heights. For such a network a 'datum-level surface' must be taken. The most convenient datum is mean sea-level and its 'ideal prolongation through the continents'.

The spheroidal form of the earth introduces a complication into precise levelling. An observer levelling from south to north, along what appeared from his observations to be a perfectly horizontal road at a height of several hundred feet above sea-level, would, in reality, be getting a little nearer to sea-level as he proceeded northwards. To correct for this, and to obtain the true heights of points above the datum-level surface—the so-called orthometric heights—a small quantity has to be added to or subtracted



accurately determined. The levelling instrument, or 'level', consists essentially of a telescope and a bubble-tube rigidly, but adjustably, connected together. In the focal plane of the telescope is an arrangement of fine scratches on glass, or

from every result of levelling which is not due east and west. With the accuracy of modern precise levelling, it is necessary, in all except very flat countries, to apply this correction to every portion of a closed circuit of levelling before the 'zero' check mentioned overleaf can be of any value.

Besides the accidental errors of observation to which levelling, like all other physical measurements, is subject, there is a systematic error which tends always to make the end point of a line of levelling appear a little too low. To counteract this tendency, all precise levelling operations are duplicated by lines which run in the opposite direction to the original.

The errors to be expected in the best class of levelling may be gauged by the resolution of the International Geodetic Association (1912), which defined precise levelling as that which showed errors, as worked out by specified formulae, not exceeding the following limits per kilometre: probable accidental error, 1.0 millimetre; probable systematic error, 0.2 millimetre. —BIBLIOGRAPHY: C. Lallemand, *Lever des Plans et Nivellement*; the publications of National Surveys on Geodetic Levelling, e.g. those of the Ordnance Survey Office, Southampton; the Survey of India, Dehra Dun; the United States Coast and Geodetic Survey, Washington.

Leven, a town of Fifeshire, at the mouth of the River Leven, on the north shore of the Firth of Forth. It carries on flax-spinning, brewing, seed-crushing, and rope-making; there are also collieries. It is connected by tramway with Kirkcaldy. Pop. (1921), 7180.

Leven, Loch, a lake of Scotland, about 10 miles in circumference, in the county of Kinross. It contains four islands, on one of which (St. Serf's) there was formerly a priory. On another (Castle Island) stand the remains of the castle of Loch Leven, once a royal residence, granted by Robert III to a Douglas. Mary Queen of Scots was confined in this castle after her capture by the confederate lords in 1567, but succeeded in escaping by the aid of George Douglas, her keeper's brother, on the 2nd May, 1568. This island is connected with the mainland by a causeway.

Le ver, Charles James, an Irish novelist, born at Dublin on 31st Aug., 1806, died 1st June, 1872. He graduated in arts at Trinity College, Dublin, in 1827, and in medicine in 1831, taking his doctor's degree a little later at Göttingen. He then returned to Ireland to practise. He contributed his first paper to the newly started *Dublin University Magazine* (March, 1834), of which he became editor in 1842. The first chapter of *Harry Lorrequer* appeared in that magazine in 1837. His *Charles O'Malley*, *Tom Burke*, and *Jack Hinton* constituted a literature

entirely *sui generis*. His later novels were more thoughtful, but less characteristic.

Lever, a bar of metal, wood, or other substance turning on a support called the *fulcrum* or *prop*, and used to balance or overcome a certain resistance (called the *load*) encountered at one part of the bar by means of a force (called the *effort*, formerly the *power*, a term now used with a different signification) applied at another part. It is one of the mechanical powers, and is of three kinds, viz.: (1) When the fulcrum is between the load and the effort, as in the hand-spike, crow-bar, &c. In this case the parts of the lever on each side of the fulcrum are called the arms, and these arms may either be equal as in the balance, or unequal as in the steelyard. (2) When the resistance is between the effort and the fulcrum, as in a smith's bellows. In the case of rowing a boat, the resistance of the rowlock is between the effort applied by the oarsman and the fulcrum formed by the water, but the propulsive force in this case is the excess of the pressure on the rowlock over the effort of the oarsman. (3) When the power is between the weight and the fulcrum, as in raising a ladder from the ground by applying the hands to one of the lower rounds, the fulcrum in this case being the foot of the ladder. The law which holds in the lever is: the power multiplied by its arm is equal to the weight multiplied by its arm. It is evident that when the power has a very large arm, and the weight a very small one, a very small power will overcome a great resistance. In the lever, as in all machines when a small force overcomes a great one, the small force acts through a much greater distance than that through which the great force is overcome, or, as is sometimes said, 'What is gained in power is lost in time', or more correctly, 'What is gained in *mechanical advantage* is lost in *speed*'.

Leverrier, Urbain Jean Joseph, French astronomer, born at Saint-Lô, in Normandy, 1811, died at Paris 1877. He devoted himself at first to chemical research, but drew the attention of Arago by some memoirs on the stability of the solar system, and he was induced to persevere with astronomical studies. His observations on the transit of Mercury in 1843 procured him admission into the Academy of Sciences. His great work was his investigation of the irregularities in the movements of the planet Uranus, carried on independently, but at the same time as the researches of John Couch Adams, which led to the discovery of the planet Neptune. He entered political life in 1849, and was made a Senator by Napoleon III. He succeeded Arago as director of the observatory, but his arrogance and violence of temper made his tenure of the office a failure. His tables for sun and planets are in general use among astronomers.

Levi'athan, a form of the Hebrew word *livyathan*, meaning a longjointed monster, applied in *Job*, xli, and elsewhere in Scripture, to an aquatic animal variously held to be the crocodile, the whale, or some species of serpent. The *Septuagint* renders it *drakon* (a dragon), and *kētos* (a whale).

Le'vites, the name generally employed to designate not the whole Jewish tribe that traced its descent from Levi, but a division within the tribe itself, in contradistinction to the priests, who are otherwise called the 'sons of Aaron'. They were the ministers of worship, specially singled out for the service of the sanctuary. Together with the priests they formed the sacerdotal tribe. A permanent organization was made for their maintenance. In place of territorial possessions they were to receive tithes of the produce of the land, and in their turn to offer a tithe to the priests. After the settlement in Canaan, to the tribe of Levi were assigned forty-eight cities, six of which were cities of refuge, thirteen of the total number being set apart for the priests. To the Levites was to belong the office of preserving, transcribing, and interpreting the law, and they were to read it every seventh year at the feast of tabernacles. Their position was much changed by the revolt of the ten tribes, and they are seldom mentioned in the New Testament, where they appear as the types of formal, heartless worship.

Leviticus, the name of the third book of the *Pentateuch*, so called from the first word of its contents. With the inclusion of certain portions of *Exodus* and *Numbers*, it has been denominated *The Priestly Code*, and is sometimes also called the *Law of Offerings*. It consists of seven principal sections, but it may be generally described as containing the laws and ordinances relating to Levites, priests, and sacrifices.

Lewes (lo'es), George Henry, philosopher and author, born in London in 1817, died 1878. He was literary editor of *The Leader* (1840-44), and published his *Life of Robespierre* (1850) and a compendium of *Comte's Philosophy of the Sciences* (1853). His *Life of Goethe*, which won him a European reputation, was published in 1855. From 1854 until his death Lewes lived with George Eliot (q.v.).—*Cf.* J. W. Cross, *George Eliot's Life as related in her Letters and Journals*.

Lewes (lo'es), a municipal borough of England, in Sussex, of which it is the county town. It is a place of great antiquity, containing the ruins of many ecclesiastical buildings. The remains of its Norman castle were presented to the nation in 1920. In its vicinity, on 14th May, 1264, the barons, under Simon de Montfort, defeated the army of Henry III. Pop. 10,798.

Lewis, Matthew Gregory, an English romanti-

cist and dramatic author, nicknamed 'Monk' Lewis, born in London 1775, died 1818. He was educated at Westminster, and then travelled for some time in Germany, the romantic literature of which gave to him that passion for the marvellous and terrific which chiefly marks his writings. His earliest and most celebrated work was *Ambrosio, or the Monk* (1794), a romance, the first edition of which was suppressed for its licentiousness. It is what is known as 'a Gothic romance', but contains incidents taken from German romance, and is historically interesting as a thread connecting the literature of Germany and England. Other works were: *Feudal Tyrants*, a romance; *Romantic Tales*; *Tales of Wonder*, in verse; *Tales of Terror*; *The Castle Spectre*, a romantic drama (1798); *Adelmorn the Outlaw* (1800); and *Alphonso, King of Castile* (1801).

Lewis Gun, an automatic magazine rifle following the general lines of the machine-gun, originated by a corporal of the Belgian army about the year 1901, and improved and patented by the Lewis Manufacturing Company of the United States in the following year. It was offered to different European Powers, but, after tests, was rejected by all of them as being too flimsy for the hard usage of war. In the years 1907, 1909, and 1912 numerous alterations were made and patented, but it was not taken up to any extent by any great military Power. Somewhere about the second year of the European War the vital necessity of providing more machine-guns of a mobile type became apparent to the British Government; in consequence large orders were placed for Lewis guns both in America and with Vickers's, and thousands were issued to British troops as they became available.

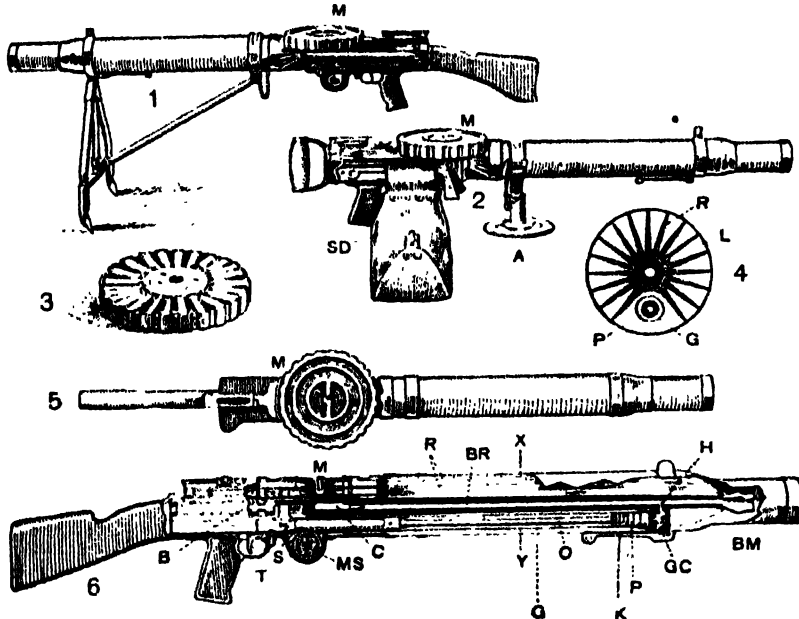
At first these guns were used only for defence and attack against enemy personnel, but as time went on they proved, when fitted with anti-aircraft sights and a special mounting, very useful against low-flying enemy planes; the fact that they can be fired from the shoulder in almost the same manner as a shot-gun has considerably increased their value for this work.

In this and other ways the Lewis gun has proved itself a most useful weapon, very accurate and extremely mobile.

The gun itself is an automatic rifle firing ordinary rifle ammunition, and is worked by a combination of gas and a spring. On the pressure of the trigger the spring draws the bolt and cartridge forward and explodes the cartridge; then part of the gas generated by the explosion, following up the bullet in the barrel, passes through a small aperture into a cylinder, strikes the head of a piston, and drives it back again. This rotates the magazine, places a fresh cartridge in front of the bolt, and compresses

the spring again. As long as the trigger continues to be pressed, and provided cartridges remain in the magazine, the gun continues to fire, unless a break in the mechanism occurs. The pan or drum, as the magazine is called, is circular in shape with an indented outer surface. On the inside the indentations take the base of the cartridges, and the center corrugations act as cogs for the automatic rotation of the magazine. The magazine or drum contains

but it has the great advantage of presenting a small target, as with the two gunners it only occupies a space of 7 feet by 2 feet. It is very mobile as compared with the Vickers or Maxim gun, and with magazine and bipod in position it only weighs about 32 lb. A spare-parts bag is carried, and almost any part can be replaced if broken, the most complicated replacement taking on an average fourteen seconds when done by a good man, the only tool necessary



1, Lewis Automatic Machine Gun with magazine and bipod. 2, As mounted for aeroplane. 3, Bottom view of magazine. 4, Section through XY in 5. 5, Top view of gun. 6, The gun in part section. M, Magazine (detachable). SD, Shell deflector for controlling the ejection of empty cartridges. A, Aeroplane mounting. R, Radiator ribs. G, Gas cylinder. L, Barrel. P, Piston. B, Bolt. T, Trigger. MS, Main spring. C, Cartridge in firing chamber. O, Rod. K, Gas regulator key. BR, Bore. GC, Gas regulator cup. BM, Bore mouthpiece or cone. H, Hole connecting the barrel with the cylinder below.

forty-seven rounds, and a good gunner can change to a fresh magazine in three seconds. The gun, when well tuned up, can fire at the rate of from six to seven hundred rounds per minute over a period, but owing to heating and the time taken in changing magazines, no more than two hundred and fifty rounds can be fired in a given minute. Owing to the great expenditure of ammunition, it is only fired in short bursts and at good targets. It is an air-cooled weapon, the cooling of which is accomplished by means of an aluminium radiator placed round the barrel and covered by a metal cylinder open at both ends. Each explosion drives out the hot air in front and behind, causing a vacuum, and the cooler outer air rushes in to take its place. Owing to its peculiar noise when firing, it is unmistakable, and if not well concealed can easily be detected,

being an ordinary cartridge. There are no screws in the weapon, all parts being slotted to take the point of a bullet.

Lewisham, a parliamentary and metropolitan borough, in the county of London, and third largest of all the metropolitan boroughs. Pop. (1921), 174,104.

Lewiston, a city of Maine, United States, on the Androscoggin River, close to Lake Auburn, the Maine State piscicultural reserve. Pop. 31,707.

Lewis-with-Harris, or The Lews, the largest of the Outer Hebrides, separated from the mainland of Scotland by the Minch, 30 to 35 miles wide. The southernmost portion of the island, Harris, is in Inverness-shire, the northern and largest portion, or Lewis proper, being in Ross-shire. The entire length of the island,

south-west to north-east, is 60 miles; breadth, varying from 30 miles to 5 and 10 miles; area, nearly 600,000 acres. It is of irregular form, is deeply indented all round by bays and inlets, and though in general flat, contains some considerable elevations, two of which rise to 2700 feet above sea-level. In the interior peat-bogs occur, with numerous small lakes and short rivers. Both the inland and coast fishing is good. Up to 1844 agriculture and education were in a very backward condition; but considerable improvements have been since made, though the fishery still waits a satisfactory development. In 1819 Lord Leverhulme bought Lewis and part of Harris. The Gaelic language is almost universally spoken. The principal town is Stornoway. Pop. of entire island, 34,400.

Lexington, a city of the United States, in Kentucky. It is the oldest town in the state (having been founded in 1773), and was once the capital. It is more a place of fashionable residence than of trade. It contains the Kentucky State university, and the Transylvania University, removed from Harrodsburg in 1803. Incorporated in 1782. Lexington became a city in 1832. Pop. 41,534.

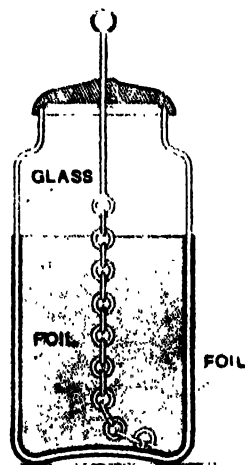
Lexington, a small town of the United States, in Massachusetts, the scene of the famous 'Skirmish at Lexington', the opening engagement of the War of Independence, 18th April, 1775. A detachment of British troops, sent from Boston to seize some provincial stores at Concord, was opposed by the Lexington militia (70 men), who were dispersed with a loss of seven killed and three wounded.

Leyden, John, Scottish poet and Orientalist, born at Denholm, Roxburghshire, 1775, died at Batavia 1811. He was distinguished for his remarkable gifts as a poet, and published translations and original poetry. His *Edinburgh Magazine*, contributed to *Four Months of Wonder*, assisted Sir Walter Scott in gathering materials for his *Minstrelsy of the Scottish Border*; and wrote a *History of African Literature*. In succession he was Presbyterian minister, surgeon with the East India Company, and professor of Hindustani, and judge.

Leyden, or **Leiden** (Lat. *Lugdunum Batavorum*; Fr. *Leyde*), a university town of Holland, encompassed by windmills, and surrounded by country-seats, pleasure-grounds, gardens, and fertile meadows. The streets are straight and broad, the Broad Street (*Brede-straat*) being esteemed one of the finest in Europe. In it is situated the town hall (*Stadhuis*), a picturesque sixteenth-century building. None of the churches is very remarkable, but in the Reformed church of St. Peter are monuments to Boerhave, Spanheim, and Scaliger. The university, founded in 1575 by William of Orange, was formerly one of

the most famed in Europe. Leyden has cloth and other manufactures. It was the birth-place of several celebrated painters, Rembrandt, Gabriel Metsu, and others. The most memorable event in the history of Leyden is the twelve months' siege it sustained from the Spaniards in 1573-4, until relieved by William the Silent. The population, about 100,000 in the seventeenth century, was 61,408 in 1920.

Leyden-jar, a form of electric condenser devised by Cuneus and Musschenbroek of Leyden in 1740. It consists of a glass jar or wide-mouthed bottle coated inside and out with tin-foil over the lower two-thirds of the surface. A brass rod passing through the neck is connected to the inside coating, and terminates outside in a brass knob which receives the charge. The jar, either singly or combined to form a battery, was used in studying the various phenomena of electric discharge. To discharge the jar, the two coatings are connected by a suitable conductor, taking care to make contact with it first on the outside coating. A Leyden-jar with movable coatings is useful for demonstrating the important part played by the medium which insulates the two coatings. After being charged, the jar is dissected by means of insulating tongs, and the two coatings are discharged. On rebuilding the jar and connecting the two coatings, a strong spark passes, indicating that the electric energy is stored in the insulator or dielectric rather than on the metal coatings of the condenser. The term 'jar' is now used as the name of a unit of electrical capacity equal to 1000 centimetres, or the 900th part of a microfarad. See *Condenser*.



Leyden-jar

Leyton, an urban district of Greater London, in the Walthamstow division of Essex. It is a favourite suburban residential district. Pop. (urban district), 1921, 128,432.

Lhasa, capital of Tibet, on the Ki-Chu a tributary of the Tsing-po (Upper Brahmaputra). All public buildings have a religious significance, for Lhasa is the focus of international Asiatic Buddhism, and a place of pilgrimage. About 1½ miles south-west from the city is the Potala, the residence of the Dalai-Lama, joint-god and

king of Tibet, and supreme pontiff of vast regions in Central, Eastern, and South-Eastern Asia. It stands on a hill rising abruptly out of the plain to the height of 307 feet, extensive and imposing, surrounded by enormous lamaseries. Lhasa is the principal emporium of Tibet: silks, tea, and Eastern merchandise are exchanged in the markets for Tibetan, Indian, and European goods. No census has ever been taken, and the floating population is abnormal on account of the multitude of nomadic pilgrims and wandering lamas who visit the capital from time to time. The estimated population is 50,000.—BIBLIOGRAPHY: E. Candler, *The Unveiling of Lhasa*; Sarat Chandra Das, *Journey to Lhasa*; L. A. Waddell, *Lhasa and its Mysteries*.

Li, Le, or Cash, the only copper coin of China, with a square hole in the middle, and an inscription on one side. Ten li make one candareen (fên), 100 a mace (ch'ien), 1000 a liang or tael, a silver coin weighing 1 k'up'ing or treasury-scale tael, or ounce (1½ oz. avoirdupois). Li is also a Chinese measure of length equal to about one-third of an English mile.

Lianas, or Lianas (Fr. *liane*, creeper, from *lier*, to bind), a term applied to those woody climbing and twining plants found in profusion in tropical climates, where in many instances they overtop the heads of the tallest trees, and intertwine the entire forest by their cable-like shoots, forming an impenetrable network, which it is necessary to break through with the hatchet. They belong to the Leguminosae, Bignoniaceae, Apocynaceae, Malpighiaceae, and many other natural orders.

Lias, in geology, a name derived, by Somerset pronunciation, from *layers*, and originally given to thin layers of limestone embedded in thick masses of blue argillaceous clay, lying at the base of the Oolitic series, and above the Triassic or New Red Sandstone. The term is now international as a synonym for the Lower Jurassic series. The formation is highly fossiliferous, from Whitby to Lyme Regis, ammonites being found in such quantities and varieties as to be called into use in the classification of the different beds. Of all its fossil remains by far the most important in England are those of the great reptiles, such as ichthyosaurus and plesiosaurus.

Libanius, Greek sophist and rhetorician, born at Antioch about A.D. 314, died at the same place about 393. He studied at Athens, and taught with great success at Constantinople and at Nicomedia. He used his eloquence in obstructing the spread of Christian ideas, and in the defence of paganism. St. Basil and St. Chrysostom were his pupils, and were warmly attached to him. His letters, 1600 in number, have, besides great literary merit, much historic value, as they were addressed to the most eminent men of his time.

Ben Jonson derived the central idea of his farce *Epicoene, or the Silent Woman*, from Libanius.

Libau (lĕ'hou; Russ. *Libava*), an important seaport of Latvia, in Courland, at the mouth of the lake of the same name, on the Baltic. It is a favourite bathing-resort, and had a considerable trade before the European War, during which Libau was several times shelled by German warships, and was captured by the enemy in 1915. It became a free port in 1924. Pop. 70,000.

Libel, in law, the act of publishing malicious statements with intent to expose persons or institutions to public hatred, contempt, or ridicule, and thereby provoking them to anger, causing a breach of the peace, injury to reputation, business, &c. The difference between libel and slander is that in the former case the defamation must have been effected in writing, printing, or some other visible manner, while in the latter the offence is committed verbally. Publication is held to have taken place if the libel is seen but by one person other than the person libelled. The law distinguishes defamatory, seditious, and obscene libel. A defamatory libel may result in civil and criminal proceedings against both the publisher and the writer, but to come under this category it is essential that the libel be false, malicious (the law presuming malice in every injury done intentionally and without justification), have a tendency to provoke hatred or contempt, and that it be non-privileged. In criminal law it is a misdemeanour to publish or threaten to publish a libel; or as a means of extortion, to offer to abstain from or to prevent others from publishing a libel. In Great Britain the maximum punishment for this offence is three years' imprisonment with hard labour. A seditious libel is one directed against the head of the State, the legislature, the courts of justice, &c., and its publication also constitutes a misdemeanour. The term obscene libel comprises any obscene publication, and the publisher thereof is liable to imprisonment with hard labour. If the charges contained in the libel are true, a civil action cannot be maintained, but the truth of the libellous matter is no defence at common law; at the same time it generally secures the defendant the merciful consideration of the court. In a civil action the plaintiff recovers damages, the amount of which is settled by the jury; upon an indictment, the jury has merely to acquit the defendant or to find him guilty, after which the court passes judgment, and awards punishment, generally fine or imprisonment, or both. In a charge against the proprietor, publisher, or editor of a newspaper, evidence may be given of the publication being (a) for the public benefit; (b) true, fair, and

accurate; and (c) without malice. Fair and accurate reports of judicial proceedings and of public meetings, meetings of town councils, education authorities, &c., are generally privileged, and the order of a judge is necessary before a criminal prosecution can be instituted.

Libel, in the English ecclesiastical and admiralty courts, is the name given to the formal written statement of the complainant's ground of complaint, in the civil litigation, against the defendant. In Scots law, an indictment on which either a civil action or criminal prosecution takes place.

Liberal Party, The, one of the great political parties of the State, has been so named since about 1830. It developed from the old party of the Whigs, which term, together with that of its rival, the Tories, was first used as a nickname in 1679. This party has held office under Earl Grey, Viscount Melbourne, Earl Russell, Viscount Palmerston, Mr. W. E. Gladstone (its greatest figure), Lord Rosebery, Sir H. Campbell-Bannerman, and Mr. Asquith. It has been responsible for many famous measures of reform, and throughout its history has engaged in a fierce struggle with the House of Lords, which rejected many of its measures. This culminated in 1911 with the passing of the Parliament Act, which severely limits the powers of the peers. Advanced Liberals in the latter part of the nineteenth century termed themselves Radicals, but this designation has now fallen into disuse. For a time before the present Labour Party took definite form, a number of Liberal-Labour candidates were returned to Parliament. The Liberals lost some of their strongest members by the Liberal Unionist (q.v.) secession in 1886, and were almost wiped out of existence at the General Election of 1918, when Mr. Lloyd George, a Liberal, who had, in 1916, succeeded Mr. Asquith as Premier of the Coalition Government formed in 1915, during the European War, was returned to continue the Coalition. The rift was accentuated by Mr. Lloyd George's action in Jan., 1922, of forming his Coalition Liberals into the National Liberal Party, between whom and the old Independent Liberals, as they are termed, a bitter feud arose.

Liberal Unionist Party, The, was formed in 1886 by those Liberals who disagreed with Mr. Gladstone's Home Rule Bill, and, headed by Mr. Joseph Chamberlain and Lord Hartington (afterwards Duke of Devonshire), seceded and entered into a compact with the Conservatives whereby the latter agreed not to contest their seats. The name 'Unionist' was first suggested by Lord Randolph Churchill in a speech at Manchester on 2nd March, 1886. Liberal Unionists held important positions in the Salisbury Government of 1895, and steadily the

party became fused with the Conservatives. Only a few returned to the Liberal fold. A separate organization was maintained until May, 1912, when it was united with the Conservatives under the title of The National Unionist Association of Conservative and Liberal Unionist Organizations, and the members of both became known as Unionists. A great deal of bitterness was imparted into politics by the secession, but Mr. Chamberlain's powerful personal influence carried practically the whole of the Midlands. Some of the Liberal Unionists objected to Mr. Chamberlain's Tariff Reform (Protectionist) proposals in 1903, and formed the Unionist Free Food League, which, however, had a brief existence. When the Irish Treaty, giving Ireland the status of a Free State, was signed in 1921, the term Unionist was declared to be a misnomer. By that time Mr. Austen Chamberlain, son of Mr. Joseph Chamberlain, was leader of the Unionist Party. In the early days of the compact the Conservatives accepted a certain measure of Liberal principles, but Mr. J. Chamberlain's advocacy of Tariff Reform marked the complete triumph of Conservatism.

Liberia, a negro republic on the west coast of Africa, founded in 1822 by liberated American slaves under the auspices of the American Colonization Society, and recognized as an independent state 26th July, 1847. It has 350 miles of seaboard, and extends some 200 miles inland; area, about 40,000 sq. miles. The soil is fertile, but the agricultural, mining, and industrial development of the country has just begun. The chief crop is indigenous coffee, other exports being palm-oil, ground-nuts, rubber, annatto seed, and rice. The climate is very unhealthy for Europeans. British weights, measures, and coinage are mostly in use, but there is a Liberian coinage in silver and copper. English is the official language. Liberia was one of the original members of the League of Nations. The population is estimated at 1,500,000 to 2,000,000. The number of American Liberians is about 12,000. Monrovia is the capital. The government of the republic is on the model of the United States. — **BIOGEOGRAPHY:** L. Jore, *La République de Libéria*; Sir H. H. Johnston, *Liberia: the Negro Republic in West Africa*; R. C. F. Maughan, *The Republic of Liberia*.

Libourne (li-bôrn), a town of France, in the department of Gironde, on the Dordogne. It has an important trade in wine and brandy. It was formerly in Guienne, and in English territory at its foundation in the thirteenth century. Pop. 15,350.

Libra, the seventh sign of the zodiac. The First Point of the sign Libra, now in the constellation Virgo, is where the sun's annual apparent path passes from north to south of the

equator. The time of its passing this point is called the *autumnal equinox*.

Libraries, the name given to collections of books, and to the buildings in which such collections are located. Libraries existed in ancient Egypt, and Diodorus Siculus describes the library of King Ozymandias (Rameses II, about 1300-1233 B.C.). From very early days almost every important temple in Babylonia had its library of clay tablets in cuneiform writing, shelved in regular order. Such a library was found at Nippur, in 1901, in the great temple of Bel. In his palace at Nineveh King Assurbanipal (seventh century B.C.) gathered a great library of probably over 10,000 works. Ptolemy is credited with having introduced a public library at Athens about 337 B.C. Cicero and various wealthy Romans made collections of books, and several Roman emperors established libraries, partly with books obtained as spoils of war. By far the most celebrated library of antiquity was the Alexandrian. In the West, libraries were founded in the second half of the eighth century by the encouragement of Charlemagne. In France one of the most celebrated was that in the abbey of St. Germain des Prés, near Paris. In Germany the libraries of Fulda, Corvey, and in the eleventh century that of Hirschau, were valuable. In Spain, in the twelfth century, the Moors had seventy public libraries, of which that of Cordova contained 250,000 volumes. In Britain and Italy libraries were also founded, particularly in Britain by Richard Aungerville; in the latter by Petrarch, Boccaccio, and others. The art of printing revolutionized the mediæval art of book-making. The principal libraries of modern times are the National Library at Paris, with 3,000,000 books and 100,000 MSS., and the British Museum library, London, with about 4,000,000 books and 100,000 MSS. The central court library at Munich, the former imperial library at Petrograd, and the former royal library at Berlin have each over a million volumes and thousands of MSS. Other large and valuable libraries are the library at Vienna; the libraries at Stuttgart, Dresden, and Copenhagen; the university libraries of Genoa, Prague, Göttingen, Upsal, Oxford, Cambridge, and Dublin; also the libraries of Moscow, Venice, Florence, Milan, Bologna, Naples, and the Advocates', Edinburgh. The Vatican library, Rome, and the Bodleian, Oxford, are particularly rich in rare books and MSS. The spread of education, and the consequent thirst for knowledge, has called into existence innumerable smaller libraries, ready of access, and providing such literature as general readers demand. The establishment of public libraries in Britain was fostered by the Public Libraries Acts, which empowered towns, local board districts, and parishes to establish

libraries to be maintained by a rate not exceeding 1d. in the £. The Public Libraries Act of 1919 removed the limit of one penny, and now local authorities have the power to maintain libraries with no restriction in regard to rate. Many of the town libraries were built by Andrew Carnegie, who also founded the United Kingdom Carnegie Trust for the purpose of carrying out and extending his work in this respect. He endowed the Trust with a sum of £2,500,000. The French Government has established over 25,000 popular libraries in connection with primary schools. The Congress Library, Washington, possesses over 2,500,000 volumes; the public library of Boston, the libraries of Harvard University, Cambridge, Yale University, and Newhaven possess each over 1,000,000 volumes. The New York Public Library possesses over 2,000,000 volumes. — **BIBLIOGRAPHY:** F. A. Savage, *The Story of Libraries*; E. C. Richardson, *The Beginnings of Libraries*; Minerva, *Jahrbuch der Gelehrten Welt*; *The Library World*.

Libration, in astronomy, generally applied to an apparent oscillatory motion of the moon. Approximately the moon always presents the same hemisphere towards the earth, owing to the synchronism of its rotation and revolution periods. But its rotation is uniform, while its revolution, being in an ellipse, varies in speed. Thus at one time we see a little more of its eastern, at another of its western side. This is called libration in longitude. Owing to the fact that the moon's axis of rotation is inclined $6\frac{1}{2}^\circ$ to the normal to its orbit, there is also a libration in latitude. Through the librations about 59 per cent of the lunar surface is visible at one time or other, leaving only about 41 per cent perpetually invisible.

Licancaur, a volcanic peak of South America, on the borders of Chile and Argentine, overlooking Atacama; height 19,521 feet.

Licence, in law, the grant of permission to do some lawful act, also the document conferring such authority. All civilized countries require that persons should not carry on certain trades or professions, or do certain acts, without previous grant of licence, and such licences may be imposed for the sake of regulating traffic or raising revenue. Most numerous are licences issued to empower persons to sell certain articles. In Great Britain the articles not to be dealt in without a licence include beer, cider, wines and spirits, tobacco and snuff, patent medicines, gold and silver, game, sweets; besides these there are licences for auctioneers, appraisers, armorial bearings, carriages, dogs, guns, hawkers and pedlars, male servants, pawnbrokers, &c. The total revenue derived from these licences in Great Britain exceeds £190,000,000, the bulk of this revenue being furnished by the beer and

spirit licences. Numerous Acts have been passed for the regulation of the liquor traffic as carried on by licence, one of the most important being that of 1828, which has been amended or supplemented by others down to 1921 (for England and Scotland). There are now in force very stringent regulations connected with the sale of intoxicating liquor. For the sale of such liquor an excise licence is necessary, and retailers also require a licence from the licensing justices of their locality. But the laws affecting liquor licences in England are not quite as in Scotland or Ireland, or even Wales. In England houses are allowed to keep open for a certain time on Sunday, but in Scotland (excluding hotels) they have long been entirely closed on that day, as they are in Ireland and Wales. The permitted hours during which intoxicating liquor may be sold on week days are eight, beginning not earlier than 11 a.m., and ending not later than 10 p.m., or if, owing to special requirements, the justices in any district so direct, eight and a half hours, beginning not earlier than 9 a.m., and ending not later than 10.30 p.m.; in the metropolis nine hours, beginning not earlier than 11 a.m., and ending not later than 11 p.m. During Sundays and on Christmas Day and Good Friday the hours are five—two between 12 noon and 3 p.m., and three between 6 and 10 p.m. Selling or supplying liquor to any person in any licensed premises or club except during the permitted hours is forbidden; but exceptions are made in the cases of lodgers, friends of the licence holder consuming liquor on the premises at an entertainment given by him at his expense, traders or clubs purchasing for the purposes of sale or of the clubs, or persons consuming within thirty minutes after the permitted hours liquor supplied to them with a meal within the permitted hours, &c. Licensed places of refreshment, where the consumption of intoxicating liquor is merely ancillary, may have an extension of one hour on week days for the supply of liquor at meals. The English Act of 1904 dealt more especially with the giving of compensation by 'the trade' to persons deprived of their licences, except on certain grounds.

Lichen, in medicine, is the name given to a disease of the skin. It is characterized by the appearance of conical or flat papules over any part of the body, but most frequently on the forearms, thighs, or neck. In the acute stage these papules have a typical lilac colour, but in the more chronic forms the spots tend to run together to form patches. The papules may disappear rapidly or persist for months, and according to the duration their site is marked by less or more pigmentation of a rich brown colour. In treatment diet should be attended to, and arsenic or mercury administered inter-

nally, with the external application of some tar or carbolic preparation.

Lichens, a very extensive order of cryptogamic or flowerless plants. They are not simple plants, but are fungi associated with Alga, the two being mutually dependent. They have neither stem nor leaves, but consist of a *thallus* varying much in form and texture. They are reproduced by spores pertaining to the fungus of the particular lichen, usually an Ascomycete; also by *soredia*, clumps of alga-cells entangled in fungus hyphae. They are common everywhere, commonly in the form of flat crusts, sometimes of foliaceous expansions, adhering to rocks, the trunks of trees, barren soil, &c. They are found flourishing in the hottest deserts, and also to the very verge of perpetual snow; one species, the reindeer-moss (*Cladonia rangiferina*), grows in the greatest profusion in the Arctic regions, where it forms the reindeer's chief sustenance. The Iceland-moss (*Cetraria islandica*) is also abundant in the Arctic regions. (See *Iceland-moss*.) Several other lichens afford dyes of various colours, these being chiefly obtained from rocks in the Azores and Canaries. Litmus is also obtained from a lichen.

Lichfield, a cathedral city of Staffordshire, England. The cathedral, a magnificent thirteenth- to fourteenth-century pile which was restored in the nineteenth century, has a richly decorated west front, and three spires—two on the west each 180 feet, and one in the centre 280 feet high. The town was the birth-place of Dr. Johnson, to whom a monument has been erected facing the house wherein he was born, where there is now a museum. The see of Lichfield was founded in A.D. 650. Pop. (1921), 6304.

Lick Observatory, on Mount Hamilton (4209 ft.), California, United States; founded by James Lick, a San Francisco millionaire piano-manufacturer (1790–1876), and formally handed over to the University of California in 1888. It possesses a refracting telescope with an object-glass 36 inches in diameter. Next to that of the Yerkes Observatory, this is the largest refracting telescope in the world.

Lictors, in Rome, were the officers who preceded the chief magistrates, consuls, and praetors to clear the way for them, and cause due respect to be paid to them. They carried axes tied up in bundles of rods, called *fasces*, as ensigns of office, and were selected from the lower class of free men. The dictators were preceded by twenty-four lictors; the consuls, decemvirs, and military tribunes by twelve; the provincial praetors, master of the horse, and proprators by six; and the quaestors by five. During the first century of the Empire the emperor was attended by twelve lictors, but Domitian increased the number to twenty-four.

Liddell, Henry George, English scholar and divine, born 1811, died 1898. Educated at Charterhouse and Christ Church, Oxford, he graduated in 1833. His co-operation with Robert Scott (afterwards Master of Balliol and Dean of Rochester) produced the famous 'Liddell and Scott' *Greek Lexicon*, which was first published in 1843. In 1846 he was appointed headmaster of Westminster School, and in 1853 became Dean of Christ Church, Oxford, resigning in 1891. The *Lexicon*, which was founded on the Greek-German lexicon of Passow, has also appeared in two smaller forms. It was for Dr. Liddell's daughter that *Alice's Adventures in Wonderland* was originally written.

Liddon, Henry Parry, English divine, born 1829, died 1890. He graduated from Christ Church, Oxford, 1850, and while there he became acquainted with Pusey and Keble. He became vice-principal of the Theological College, Cuddesdon (1854-9), and in 1864 was appointed prebendary of Salisbury Cathedral. His Hampton Lectures (1866) were afterwards published as *The Divinity of Jesus Christ*. In 1870 he became a canon residentiary at St. Paul's, and Ireland professor of exegesis at Oxford. He resigned this professorship through ill-health (1882). His works include: *University Sermons* (1865), *Some Elements of Religion* (1872), *English Church Defence Tracts*, and the posthumous *Life of Pusey* (4 vols., 1893-7).—Cf. A. B. Donaldson, *Five Great Oxford Leaders*.

Lie (lê), Jonas Laurits Edemil, Norwegian novelist, born 1833, died 1908. He chose the sea as a profession, but owing to weak eyesight he was compelled to give it up. After studying at Christiania he became a lawyer. In 1868 he abandoned the law and went to Christiania to support himself by literary work. In 1870 he was very successful with a novel entitled *The Visionary*. His subsequent works include: *The Three-Master's Future*, *The Pilot and his Wife*, *Forward! Life's Slaves*, *The Commandant's Daughters*, and *Two Lives*. His chief works have been translated into English.

Lie, Marius Sophus, Norwegian mathematician, born 1842, died 1899. He was appointed to a professorship in Christiania in 1872, and succeeded Klein at Leipzig in 1886, but was subsequently induced to return to Christiania. Lie stands high on the list of the score or so of great mathematicians of the nineteenth century, and a very considerable part of the tremendous advances made in mathematical science during the last fifty years must be put to his credit. Among his works are: *Theorie der Transformationsgruppen* (1888-93) and *Vorlesungen über Differentialgleichungen* (1891).

Liebig (lê'bîk), Justus, Baron von, German chemist, born at Darmstadt 1803, died at Munich

1873. From 1825 he was ordinary professor of chemistry at the University of Giessen, a chair he held for twenty-five years. In 1830 he replaced Professor Gmelin at Heidelberg, and in 1852 he accepted the chemistry chair at Munich. The Munich Academy of Sciences elected him president in 1860. The results of Liebig's labours were generally given in the scientific reviews of the time, but chiefly in his own organ, the *Annalen der Pharmacie*, in *The Transactions of the Royal Society of London*, and the *Mémoires de l'Académie des Sciences*. Liebig is regarded as the founder of organic chemistry, owing to the many discoveries he made in this department. He did much to improve methods of analysis; his *Chemistry of Food* inaugurated more rational methods of cooking and using of food; while agriculture owes much to his application of chemistry to soils and manures. The Grand-Duke of Hesse created him an hereditary baron, and he received many honours from universities and learned societies.—BIBLIOGRAPHY: A. W. von Hoffmann, *The Lifework of Liebig*; W. A. Shenstone, *Justus von Liebig: his Life and Work, 1803-1873*.

Liebknecht, Karl, German Socialist, born 1871, died 1919. The son of Wilhelm Liebknecht, he practised at Berlin as a barrister, and was sentenced to eighteen months' imprisonment for the publication of a pamphlet entitled *Militarism and Anti-Militarism* (1907). Elected to the Reichstag (1912), he disclosed the Krupp scandals (1913), bitterly opposed the European War, and was called to a labour battalion (1915). In 1916 he was expelled from the Reichstag and sentenced to two and a half years' penal servitude, degradation, loss of civil rights, &c., for 'treason', through his organization of a May Day demonstration. On appeal the sentence was extended to four and a half years, but he was released under the political amnesty (Oct., 1918), when he joined Rosa Luxemburg and directed the Spartacist rising, during which he was arrested and accidentally shot.

Liebknecht, Wilhelm, German Socialist, born 1826, died 1900. During the revolutionary period of 1848 he was exceedingly active, attempted to form a Republic of Baden, and retired to London, where he became acquainted with Karl Marx. On his return to Germany (1861) he became editor of the *Norddeutsche Allgemeine Zeitung* (1862), and was several times banished and punished for opposing Bismarck. While in jail he was elected to the Reichstag (1874). He edited *Vorwärts* (1890), and was finally imprisoned (1895) for *lèse-majesté*.

Liechtenstein, a small principality consisting of Schellenberg and Vaduz, formerly fiefs of the Holy Roman Empire. Until 1918 it formed a portion of the Austro-Hungarian

monarchy, but declared complete independence on 7th Nov., 1918, the posts and telegraphs being controlled by Switzerland at the invitation of the principality. The industries are knitted goods, agricultural produce, and cattle. Area, 65 sq. miles; pop. about 11,000, nearly all Catholics and of Teutonic descent. The capital is Vaduz (pop. 1142).— Cf. A. Helbock, *Quellen zur Geschichte Vorarlbergs und Liechtenstein*.

Liège, a town of Belgium, capital of the province of Liège, and magnificently situated on the Meuse, is one of the principal manufacturing towns of Belgium. It produces big guns, fire-arms, machine tools, and metals; coal has been worked near the town, and textile industries are prominent. From the eighth century it was always recognized as a bishopric (principality) and a direct fief of the Church, the ruler being the Prince-Bishop of Liège, and this was continued until the Treaty of Lunéville in 1801. In 1408 the town was sacked by William the Bold, duke of Burgundy, de la Marek, and other plunderers of that time. Marshal Rousiers bombarded it in 1691, and the duke of Marlborough took it in 1702. In 1795 France included it in the department of the Ourthe, but restored it to Belgium in 1815. It is essentially the Walloon capital. During the European War Liège was attacked by German forces on 5th Aug., 1914, but did not capitulate until the 7th, and the last forts were not reduced until the 16th of Aug. Pop. (1920), 166,697.— Cf. Sir Walter Scott, *Quentin Durward*.

Liège, Province of. Area, 1117 sq. miles; pop. (1920), 869,360.

Liegnitz (lěh'nits), a town of Silesia, Prussia. It has many historical buildings, and manufactures machinery and hardware, pianos, gloves, woollens, cottons and linens, and hosiery. Pop. 70,337.

Li'en (Fr. *lien*, bond, from Lat. *ligamen*, band), in law, in its most usual acceptation, signifies 'the right which one person, in certain cases, possesses of detaining property placed in his possession belonging to another, until some demand which the former has is satisfied'. In Great Britain liens are of two kinds: (1) *particular liens*, that is, where the person in possession of goods may detain them until a claim, which accrues to him from those *identical* goods, is satisfied; (2) *general liens*, that is, where the person in possession may detain the goods, not only for his claim accruing from them, but also for the general balance of his account with the owners.

Lierre (lě-är; Fl. *Lier*), a town and railway junction of Belgium, in the province of Antwerp, at the confluence of the Great and Little Nèthe. It manufactures linen, woollen, silken, and cotton fabrics and lace. During the European War

Lierre, an outer-ring fort, was bombarded by the Germans in Oct., 1914, in the fighting which preceded the fall of Antwerp. Pop. 25,600.

Lieutenant, a military officer next below a captain. A lieutenant in the navy is the officer next in rank to a lieutenant-commander. A naval lieutenant of eight years seniority, or a lieutenant-commander, ranks with a major in the army, a lieutenant of under eight years seniority with a captain.

Lieutenant, Lord, of a county, in Great Britain, an officer appointed by the Crown, the permanent and chief local representative of the sovereign. The office is supposed to have been instituted about the reign of Henry VIII. He appoints a certain number of deputy-lieutenants, subject to royal approval; he also nominates persons for service as justices of the peace for the county, the latter being also sub-deputy lieutenants. He may also recommend for first commissions in the reserve forces. He is *ex officio* a member of the County Council.

Lieutenant-colonel, in the British army, is the officer junior to a colonel, and senior to a major. He may have actual command of a regiment or battalion, and is responsible for the discipline, training, and comfort of the troops under his command, and for the various details of their organization. A major can become a lieutenant-colonel by brevet as a reward for good service. Brevet rank confers army, but not regimental rank, i.e. the officer takes rank in his regiment according to his seniority as major, but outside it according to the date of his brevet. A captain and brevet-major may also receive a brevet of lieutenant-colonel. In conversation or in unofficial correspondence the word brevet is omitted. A brevet does not carry pay of rank.

Lieutenant-general, a general officer in the army, ranking above a major-general and below a general, equivalent to the naval rank of vice-admiral.

Life is a term applied to the distinctive attribute of all plants and animals, and the mysterious motive force that impels them to grow and develop, display a variety of activities, and reproduce their kind. It is difficult to define, because we are unable to comprehend what it is and how it originated; all that we can do is to study its manifestations and attempt to interpret their meaning, an occupation which has engaged the attention of mankind for more than sixty centuries, and even, perhaps, ever since the human family came into existence and attempted to explain the meaning of the living world around them. There are reasons for believing that the earliest members of the species *Homo sapiens* in Europe, the so-called Crê-Magnon race which left its remains in the Upper Palæolithic deposits

of France, Britain, and elsewhere, regarded blood as life, an idea which is expressed in the Old Testament. According to this belief, life was the red substance the loss of which caused unconsciousness and death. But at a later stage, when it was realized that a living creature could die without any loss of blood, the new view was propounded that the breath was life, and that the purpose of respiration was to convey the vital stuff to the heart and the blood. The fact that the inundation of the Nile made the desert fertile and infused vitality into the apparently dead seed started yet another theory, that water was the vital substance; and this was applied to animals when it was supposed that the life of a new creature was produced by the introduction of water (semen) into the mother, or, as the ancient Assyrian and Hebrew word expresses it, by irrigating her. This ancient Egyptian theory was adopted more than twenty centuries later by the Ionian philosopher Thales, and made the basis of his speculations.

This persistent study of the nature of life by early man was not inspired merely by scientific curiosity or the joy of speculation, but by the purely selfish and practical aim of life insurance. Before man fully appreciated the fact that death was the inevitable fate of all, he was continually striving to discover the means of preserving his life and his youth, as men and women still do. But in early times men firmly believed that if they could add to their vital substance by means of some *elixir vite* or some life-giving amulet, they might rejuvenate themselves or retain their youth and virility, or ward off the danger to life by injury or disease, or prolong their existence even when death seemed to have destroyed their bodies. The firm belief in the possibility of these things was the original foundation of all philosophy and all early religions. The essential powers of every deity are expressed in the phrase "I am the resurrection and the life". But the search for the elusive *elixir vite* throughout the ages is mainly responsible for the growth of scientific knowledge and a fuller understanding of the nature of the problem to be solved to explain life. The investigation of the claims for the origin of life by spontaneous generation led Pasteur to make discoveries upon which the modern theory of the causation of many diseases is founded. It provided Lord Lister with the data for his views which made possible the wonderful developments of modern surgery, which have saved countless thousands of human lives. But the refutation of the crude ideas of spontaneous generation that prevailed in the Victorian era merely shut off one avenue of approach to the solution. Many writers, following Lord Kelvin (1871), have attempted to remove the question

out of the field of practical investigation by putting forward the claim that living matter was introduced on to the earth from some planet, because it is a fundamental principle of mundane conditions that 'dead matter cannot become living without coming under the influence of matter previously living'. But this merely evades the issue. The success of modern chemists in building up synthetically many organic compounds previously known only as the result of vital activities of some 'plant or animal has to some extent opened the way for a more sharply defined attack on the nature of life. Chemists are now able to produce very complex organic compounds, in some cases with a very near approach to vital material. But the living properties of the substances of animals and plants depend on what the chemist calls 'labile molecular unions', and these are found not only in living structures but also in inorganic colloids. The term 'colloid' was introduced nearly sixty years ago by Thomas Graham, because one of the most typical of this group of substances is gelatine (Gr. *colla*, glue). He recognized the close relationship of colloids to the phenomena of life. All the known properties of colloids can be traced to feeble molecular affinities between large groups of molecules or solution aggregates, amongst which there is a balance of the play of energies in the most delicate equilibrium, analogous to that of a living organism. It is difficult to exaggerate the importance of Graham's work and his clear vision of its significance. Professor Benjamin Moore sums up the problem of the origin of life in these words: "If a mental picture be conjured up of a world in which there is as yet no life, but where conditions are suitable for life to appear . . . inorganic colloids must first develop, and in time one of these must begin to evolve, not a living cell, not anything so complex as a micrococcus or a bacillus, not even a complex protein, carbohydrate, or fat, but some quite simple form of organic molecule, holding a higher store of chemical energy than the simple inorganic bodies from which it was formed. To carry out such a function the inorganic colloid must possess the property of transforming sunlight, or some other form of radiant energy, into chemical energy. Later, such simple organic compounds, by the agency of the same or some other colloid, and with a supply of external energy, would begin to condense and form more complex organic molecules, and finally complexes of inorganic and organic matter would come into existence as crystallo-colloids. In this way, without any hiatus, life would be led up to, and inaugurated."

Every living organism consists of one or more cells; and the body of one of the higher animals is an assemblage of countless millions of such

units, which are so co-ordinated and have their functions so integrated that they form an harmoniously working organism. Each of the living cells of which it is composed itself consists of a combination of colloids in dynamic equilibrium, carrying on an exchange of energy with one another and with their environment.—BIBLIOGRAPHY: A clear and simple account of this highly complex subject is given by Benjamin Moore, *Origin and Nature of Life* (1912), where a concise bibliography will also be found. For early speculations on the nature of life see G. Elliot Smith, *The Evolution of the Dragon*.

Life-belt, or Life Preserver, a device for the saving of life at sea, consisting of blocks of cork stitched in canvas, carrying shoulder-straps and strings for securing the belt when in use. Those supplied to the Royal Navy weigh 5 lb., have a buoyancy of 20 lb., and are capable of supporting one man.

Life-boats may be of two distinct types, either those carried on board ship for emergency purposes, or those housed in stations around the

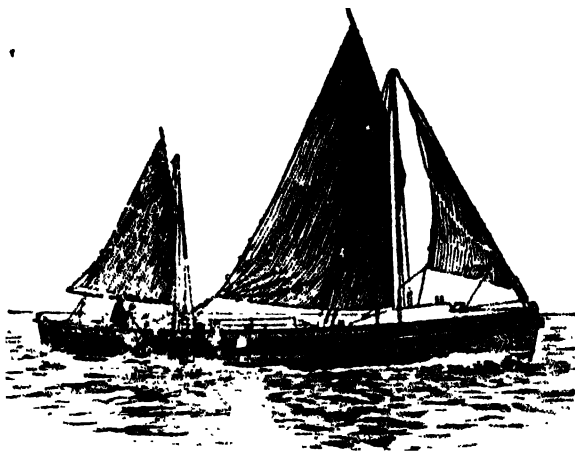
passengers with life-preservers, and their accommodation upon loose deck superstructure which is fitted with beekets and made adaptable as rafts. Those who are unable to find a seat in one of the boats merely adjust their life-preservers, and either cast one of these deck-seats, deck-house roofs, &c., over the side, or await the sinking of the vessel, when these loose contrivances remain on the surface. It is compulsory for ships of a certain size to carry one or more motor life-boats fitted with wireless. The Board of Trade fully recognizes the Fleming earless (hand-lever propelled) life-boat. Nesting, or placing a smaller life-boat within a larger one, is sometimes resorted to aboard ship, with the idea of saving space. Steel boats with special joints, forming frames, such as the Meehan, are eminently adaptable to this form of storage. Submarines and craft that are invariably cramped for head-space are frequently equipped with *Berthon boats*, devices of canvas and collapsible struts, resembling slightly the coracle of the ancient Britons.

Station life-boats, some 250 in number on the British seaboard, are controlled by the Royal National Life-boat Institution, founded in 1824, and supported entirely by voluntary contribution (22 Charing Cross Road, London, W.C.).

The old sail-and-oar method of life-boat construction is gradually being supplemented by motor propulsion, and the general lines of the new craft are illustrated in the following diagram. A station life-boat differs very much from an ordinary cabin cruiser, or, indeed, from any other kind of small craft. She is intended for use in heavy seas, and must, therefore, possess great strength, buoyancy to an exceptional degree, and the power of ejecting automatically the incoming water.

'Thews and sinews' are ensured by laying the planking on the double-diagonal system, in two layers, a layer of calico and white lead filling the space between them. Buoyancy is provided by means of tanks and cases filled with air, and stored right round the sides, so that, even when stove in, the combined buoyancy of the undamaged tanks ensures the power to float (diagram). Bilge water is ejected by means of non-return valves. It will be observed that a drop-keel (centre-board) is carried, essential to stability when the sail is in use. The propeller is sometimes prevented from fouling ropes or wreckage by means of a special tunnel.

Launching from shipboard is accomplished



The Blyth Motor Life-boat

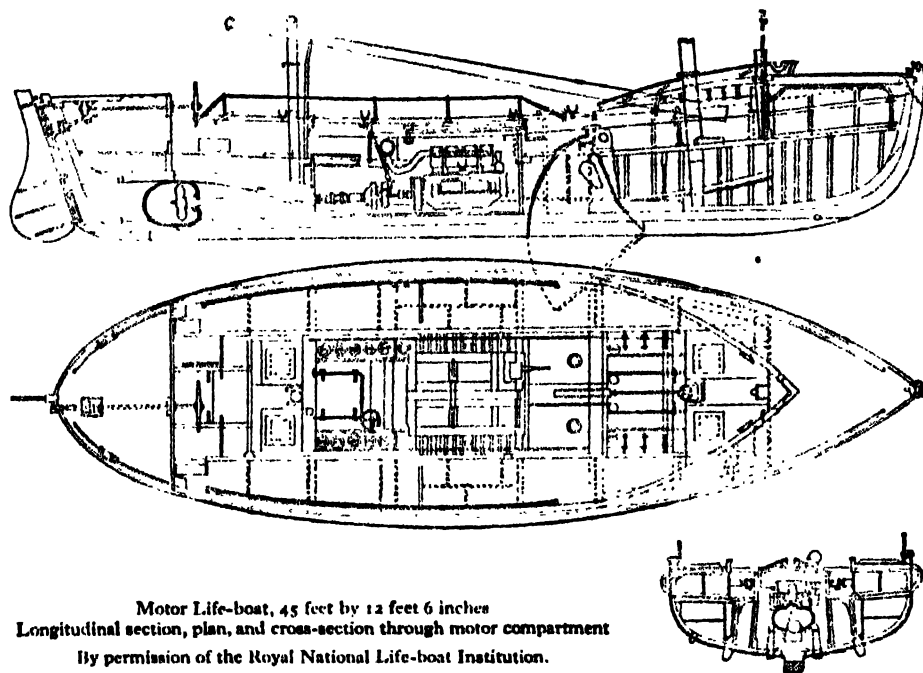
By permission of the Royal National Life-boat Institution

coasts of Britain, France, and the United States, but both are maintained primarily for the saving of life at sea. In cargo steamers sufficient life-boat accommodation is easily provided for all hands, but in passenger vessels the problem of boat-deck space does not permit of the provision of boat-space for all, consistent with convenience in launching, general comfort upon normal occasions, and rapidity of action in time of emergency. Regulations based upon the lessons taught by the sinking of the ill-starred *Titanic* in April, 1912, have been in force for some time, and make provision for the equipment of all

by means of davits (q.v.) or by a derrick and winch, or donkey-engine, and from the shore through the agency of slipways (the commonest method), or by means of some patent device

life-renter, the proprietor of the subject the *flar*, and the subject the *fee*.

Liffey, a river of Ireland, rising in the mountains of Wicklow, flowing through Kildare and



Motor Life-boat, 45 feet by 12 feet 6 inches
Longitudinal section, plan, and cross-section through motor compartment
By permission of the Royal National Life-boat Institution.

applicable to a specific station. A list of life-boat stations, &c., will be found in *Brown's Nautical Almanac* (yearly).

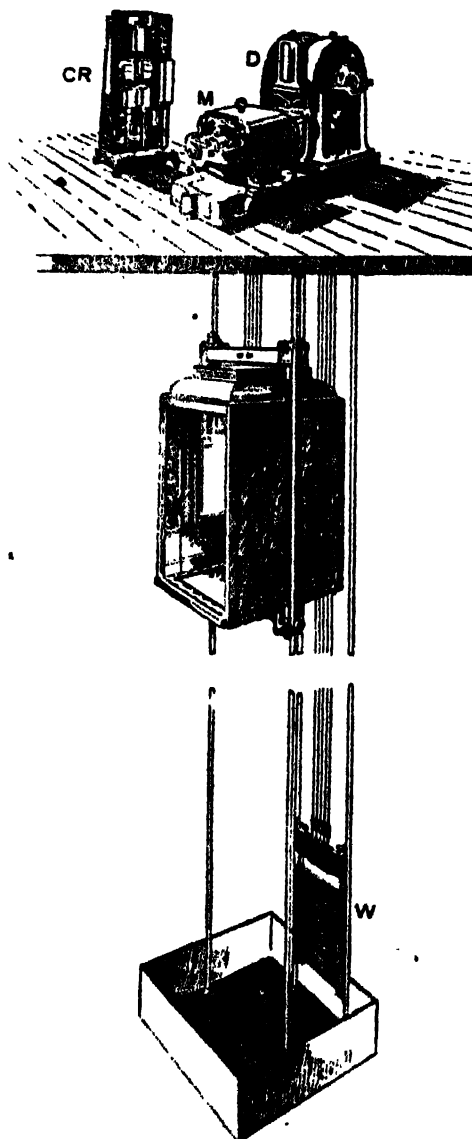
Life-buoy, a circular device sometimes made from cork, and frequently constructed of steel divided into compartments. Beackets, or life-lines, are hung around all life-buoys, so that several persons may be supported by them at once. Night life-buoys usually consist of a yellow-pine cross carrying a hollow copper sphere upon each arm. Galvanized man-ropes radiate from the centre of the cross. The buoy carries a weighted cylinder of 'calcium light', and when let go into the water, extracting-rods drop out, pulling the socket out of the lid of each calcium light, and allowing the water to enter and ignite the phosphide of calcium. The lead weights keep the cylinder upright in the water, and the flame emanating from the top blazes violently for half an hour, so that rescue work is facilitated. A spirit ration and a whistle are carried in little hollows pierced in one of the globes.

Life-rent, in Scots law, the use and enjoyment for life of a sum of money or an heritable subject, the person enjoying it being called a

the county and city of Dublin into the Irish Sea; length, 50 miles. See *Dublin*.

Lifts, Electric, are operated by direct or alternating currents. The lift cage is suspended by ropes passing over a drum at the head of the shaft, and carrying the balance weights at their other end. The grooved drum is driven by the motor through oil-immersed worm-gearing. Where a direct-current motor is in use a compound-wound field system is adopted for starting, and the series coil is cut out when full speed is attained. The motor is operated by an automatic rheostat set in action by the control-switch within the cage. The motor is fitted with a brake, which is held out of action at all times when running is desired, and is arranged to act immediately if there is any interruption of the electric supply. Safety devices are fitted to prevent the cage continuing in motion to the extreme top and bottom of the lift shaft, and to lock the cage on the guides if the suspending ropes break. Button-operated lifts are useful where the work is not heavy. The rheostat control of the motor is more elaborate, as the stop-page must take place automatically at the proper level for each floor required.

Lifts, Hydraulic. See *Hydraulics and Hydraulic Machinery.*



Electric Passenger lift

CR, Control rheostat. M, Motor. D, Drum.
W, Balance weight.

By permission of Messrs. Waygood-Otis, Ltd.

Ligament, in anatomy, the strong, tendinous, inelastic white bands which surround the joints, and connect bones, or strengthen the attachments of various organs, or keep them together. Every joint is surrounded by a capsular liga-

ment; the tendons at the wrist and ankle are bound down by what are called the annular ligaments. In dislocations of joints the capsular ligament is often broken.

Light is a wave form of energy which is radiated from luminous bodies. It is the agency by means of which the object seen influences the eye which sees it. The object may be self-luminous, as the sun, stars, lamps, the glow-worm, and the fire-fly; or it may reflect or emit in a modified form some part of the light which falls on it, as the moon, the planets, and the various objects round about us. The vibrations of the luminous body are communicated to the ether (q.v.), a medium which fills all space, whether occupied by matter or void, and waves spread out through this medium, travelling at the rate of 186,000 miles per second. The nature of light has been the subject of various hypotheses. Newton supposed that extremely small corpuscles were shot out in great numbers at very high speed from luminous bodies, that these travelled in straight lines and rebounded from matter with which they collided, and by their mechanical action on the eye caused the sensation of sight. This *emission theory* was, however, not wholly satisfactory, and was discarded in favour of the *undulatory theory*. Huygens, about 1690, suggested the hypothesis of the luminiferous ether and the propagation of light through it by means of waves. His theory made little progress until the beginning of the nineteenth century, when its truth was established by the experiments of Young, Fresnel, and others. Clerk Maxwell's *electromagnetic theory of light* supposes the waves to be caused by oscillations of electrostatic and magnetic force in directions mutually perpendicular to the direction of motion of the wave and to each other.

In any homogeneous medium light-waves travel in straight lines with uniform speed; the straight line which denotes the direction of motion is called a ray of light. As a consequence of the *rectilinear propagation* of light, when an opaque object is interposed in the path of the light, the space behind the object receives no light, and the object casts a shadow. *Eclipses* of celestial bodies are due to shadows caused in this way (see *Eclipses*). The working of a pin-hole camera also depends on the rectilinear motion of light-waves. As the light spreads out from a luminous body, its intensity diminishes as the distance from the source increases, and the intensity is reduced to one-quarter when the distance is doubled, or, more generally expressed, the intensity varies inversely as the square of the distance from the source. *Photometry* (q.v.) deals with the measurement of luminosities of sources and of the illumination of surfaces by

these sources, the units employed being respectively the standard candle and the foot-candle, or the illumination produced by a standard candle at a distance of 1 foot (see *Candle Standard*). When light falls on matter, it may be reflected, absorbed, or transmitted. The reflection of light by a surface in all directions is called the scattering or diffusion of light, and it is by means of this irregularly reflected light that we see the objects round about us. When light penetrates the surface and undergoes partial absorption, the nature of the light which is emitted determines the colour or appearance of the surface (see *Colour*; *Fluorescence*). When the surface of a body is smooth and polished, it reflects light according to the following laws: the incident and reflected rays are in the same plane as the normal to the surface at the point of incidence; the angle of incidence is equal to the angle of reflection. *Reflection* (q.v.) treats of the properties of mirrors, plane, convex, and concave, of the images which these mirrors produce, and their nature. Light, on passing from one transparent medium to another, is transmitted through the second medium at a different speed and generally in a different direction. The rays undergo refraction or bending at the surface separating the two media. Rays which pass from air to a denser medium, such as water or glass, are refracted towards the normal at the point of incidence. The amount of bending is determined by the following laws: the incident and refracted rays are in the same plane as the normal at the point of incidence; the sine of the angle of incidence bears a constant ratio to the sine of the angle of refraction, for any two media. This ratio is the index of refraction for the media, being about $\frac{4}{3}$ for air to water, and about $\frac{3}{2}$ for air to glass; it is also the ratio of the velocities of light in the two media. *Refraction* (q.v.) treats of the transmission of light through rectangular blocks, prisms, and lenses, of the amount of bending which rays undergo on passing through these bodies, and of the images which are formed. Refraction of rays of composite light is accompanied by the breaking up of such light into its constituents, as in the formation of a spectrum. *Dispersion* treats of the amount of separation of the different colours caused by different refracting materials (see *Dispersion*; *Rainbow*). The methods of obtaining spectra, the classification of spectra, and the knowledge derived from their study are alike of importance to the physicist, the chemist, and the astronomer (see *Spectrum*; *Spectra, Theory of*). The velocity of light was measured by Rømer, a Danish astronomer, in 1673, from observations of the times of eclipse of Jupiter's moons; Bradley, an English astronomer, determined the velocity by means of the aberration of star-light;

and Fizeau, Foucault, and others found its value by using terrestrial distances. When light-waves are reflected to the eye from the upper and under surfaces of a thin film of transparent material, such as a film of oil on water, the two sets of waves arrive at the eye in different phases, and interfere to produce colour if a white light is employed, or bright and dark bands if monochromatic light is used. *Interference* (q.v.) includes the study of wave phenomena, of the different methods of producing bands, and their employment in calculating the wave-length of light. The waves of light, being very short in comparison with common magnitudes, are incapable of bending round a corner to any great extent. The bending or *diffraction* (q.v.) may be observed by looking through a handkerchief at a distant lamp-light, or by looking at the distant light through a lens with a needle immediately in front of it. Diffraction bands are seen surrounding the needle and within its geometrical shadow. Diffraction gratings are employed in the study of particular lines in spectra on account of their high resolving power, in particular the Michelson echelon grating, by means of which the red hydrogen line has been found to be double.

Polarization (q.v.) is an effect observed in light which has been reflected, or which has passed through certain crystals, or transparent media subjected to strain. In a beam of ordinary light the vibrations take place in all directions across the line of propagation of the wave; but in a beam of polarized light the vibrations are confined to a certain mode, and the light may be plane, elliptically, or circularly polarized. Plane polarized light is obtained from crystals and in reflected light. In the first case it is accompanied by double refraction. When a ray of light is incident on a crystal of calcite or Iceland spar, it is broken up into two rays, each of which is plane-polarized.

Physiological or visual optics deals with the structure of the eye, its optical properties, and the defects of vision, the methods of testing eyesight, and the use of spectacles.

Light is necessary for the proper growth of plant and animal life. It has also curative properties, as seen in Finsen's successful application of sunlight in the cure of lupus. Light also has an ionizing action on gases, which causes the gas to become a conductor of electricity, so that a charged insulated body loses its charge under the action of the light. This property is confined to the ultra-violet waves, and a similar effect is caused by radium. Another effect is that which takes place in a selenium 'cell'; when light is incident on selenium, it causes the electrical resistance of the latter to fall to a small fraction of the value which the resistance

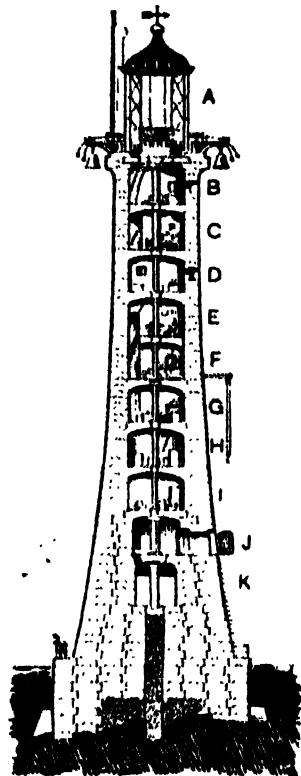
has where unilluminated. This property has been employed in the optophone, an instrument intended to enable blind people to read an ordinary book (see *Photo-electricity*). Another connection between light and electricity was established by the experiments of Hagen and Rubens (1903), which show that the electrical conductivity of a metal may be deduced from a knowledge of the reflecting power of the metal for light.—BIBLIOGRAPHY: A. P. Deschanel, *Natural Philosophy*; Sir G. G. Stokes, *On Light* (Burnett Lectures); R. S. Heath, *Geometrical Optics*; R. W. Wood, *Physical Optics*; E. Edser, *Light for Students*; R. A. Houstoun, *A Treatise on Light*.

Light, Artificial, any kind of illumination used when and where the natural light from sun or moon is unavailable. Some form of artificial light must have been in use for domestic purposes from the very earliest times, but though large cities and a high state of civilization existed among the Egyptians, Greeks, and Romans, the systematic lighting of streets was unknown to them. From the writings of Libanius, however, who lived in the beginning of the fourth century after Christ, we may conclude that the streets of his native city, Antioch, were lighted by lamps, and Edessa, in Syria, was similarly illuminated about A.D. 500. Of modern cities Paris was the first to light its streets. In the beginning of the sixteenth century it was much infested with robbers and incendiaries, so that the inhabitants were ordered, in 1524, to keep lights burning after nine in the evening, before all houses fronting a street. In 1588 *fatols* (large vases filled with pitch, resin, and other combustibles) were erected at the corners of the streets. In London the inhabitants were instructed to hang out candles in 1606. A more definite order was issued in 1608, and a housekeeper was required to hang a light on the wall, every night, as soon as it was dark, between Michaelmas and Lady day, and to keep it burning till the hour of twelve at night. Successive Acts of Parliament and orders of the common council provided from 1606 to 1690 for the better lighting of London. The House commenced street lighting in 1552, Hamburg in 1675, Berlin in 1679, Copenhagen in 1681, Vienna in 1684, Hanover in 1690, Leipzig in 1702, and Dresden in 1705. The application of coal-gas to economical purposes by Murdock in 1805 opened a new era in artificial lighting. For street lighting in cities gas had no competitor for many years, but the introduction of the ordinary electric arc lamp, and its later modifications with magazine for carbons and the flame arc, changed the outlook, and led to thorough investigations of street illumination by means of photometers. The nitrogen-filled metallic filament lamp has now almost entirely replaced the

arc lamp. See *Electric Light*; *Gas Manufacture*; *Lamp*; &c.

Lightfoot, Joseph Barber, Bishop of Durham, born at Liverpool in 1828, died 1889. Educated at King Edward's School, Birmingham, and Trinity College, Cambridge, he graduated in 1851 as senior classic, and became a tutor of Trinity College. He was successively Hulsean professor of divinity, examining chaplain to the Archbishop of Canterbury, Canon Residentiary of St. Paul's, and Lady Margaret professor of divinity at Cambridge. In 1879 he was translated to the see of Durham. A Biblical scholar of the first rank, Bishop Lightfoot took an important part in the revision of the authorized version of the New Testament. His works include commentaries on the *Galatians*, *Philippians*, *Colossians*, and *Philemon*, and volumes of sermons.—Cf. B. F. Westcott, *Bishop Lightfoot*.

Lighthouse, a tower or other lofty structure with a powerful light at the top, erected at the entrance of a port or on some rock or headland, and serving as a guide or warning of danger to navigators at night. The Pharos of Alexandria, founded about 300 B.C., is the earliest building erected expressly as a lighthouse of which we have any authentic record. Lighthouses are supposed to have been erected by the Romans at Flamborough Head, Dover, and Boulogne. In modern times the first important lighthouse erected was the Tour de Cordouan, at the mouth of the Garonne in France, founded in 1584 and completed in 1610, altered and improved in 1727. The first sea-light on the British coasts, for which a toll was



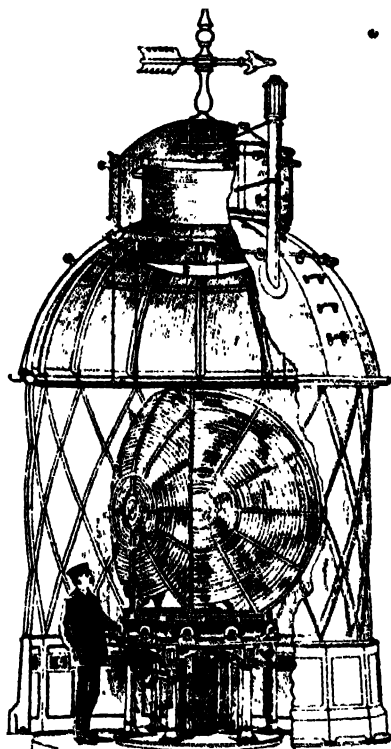
Vertical Section of Eddystone Lighthouse

A, Lantern. B, Service room. C, Bedroom. D, Low light room. E, Lavatory. F, Crane and store-room. G, Store and coal-room. H and I, Oil rooms. J, Entrance. K, Water tanks.

leviable, was that of Dungeness, for which letters patent were granted by James I shortly after his accession. Until about 1076 nearly all the lighthouses were provided by private persons; subsequently they began to be built by the corporation known as Trinity House, and an Act passed in 1836 empowered the corporation to purchase all private lights. By the Merchant Shipping Act, 1854, the supervision of the lighthouses passed into the hands of the Board of Trade, Trinity House being the administrative body for England and Wales, the Commissioners of Northern Lighthouses for Scotland and Isle of Man, and the Commissioners of Irish Lights for Ireland. The light dues vary between £300,000 and £400,000 annually.

At first burning wood provided the light, but later was superseded by fires of coal exposed in open chaffers upon the top of a tower. When oil was first introduced as an illuminant is not known. An immense improvement in lighting was made a few years previous to the French Revolution by the introduction of parabolic reflectors, which concentrate and throw forward in a horizontal direction the rays of light proceeding from lamps placed in their foci. At the same time the revolving frame carrying the lamps and reflectors was introduced. This mode of lighting is termed the *catoptric* or *reflecting* system. It is so called in opposition to the *dioptric* or *refracting* system, in which the illumination is produced by a central lamp, the rays from which are transmitted through a combination of lenses by which it is surrounded. The adoption of lenses in lighthouses, though suggested as far back as the middle of the eighteenth century, was first carried into practical effect in 1819 by M. Augustin Fresnel (q.v.). The advantages which this system possesses over that of reflectors has led to its adoption in most lighthouses. Fresnel also combined the two systems, the apparatus consisting of a number of rings of glass of various diameters, arranged one above another in an oval form. The middle rings form a cylindrical lens through which the rays from the central lamp are transmitted by *refraction*, while the other rings or prisms are constructed in such a manner as to project by *reflection* the light from the focus in a direction parallel with the refracted rays. The light thus obtained is termed the *catadioptric* light. A modification of the dioptric and catadioptric systems was introduced by Thomas Stevenson under the designation of the *holophotal* system, its object being to effect the useful application of the *whole* of the light. The lantern of a lighthouse is shown in the figure. As the revolving system is of great weight, a mercury float is employed to relieve the load on the engine or motor.

A lighthouse must have some mark by which it can be distinguished from any other in its neighbourhood. Distinguishing marks (*characters*) in common use are: fixed light; flashing light, showing one flash at intervals of a few seconds; group-flashing lights, showing two or more flashes in quick succession, followed by a longer period of darkness; and occulting lights,



The Lantern-room of a Lighthouse

Part of the framework is removed to show the lenses and revolving frame.

which show a fixed light and are eclipsed for a few seconds at regular intervals. A system of alternate flashes and eclipses (on the Morse alphabet principle) has been in some cases adopted to mark particular lights. Coloured lights, red and green, are also used with any of the foregoing characters to produce further distinctions, but in general only to mark danger arcs, or in conjunction with a white flash, as the tinted-glass shades seriously impair the power of the light, the colour of which, moreover, is not easily distinguishable in foggy weather. To produce the various characters requires the use of a revolving apparatus bearing the lenses. To give great illumination tiers of superimposed

lenses, each with a separate burner in its focus, are in some cases employed.

Oil, particularly mineral oil, is employed in plain wick burners or with incandescent mantles. Gas has been substituted for oil in some light-houses; oil-gas and acetylene are successfully employed in illuminating buoys for the guidance of vessels. Oil-gas buoys are charged to a pressure of perhaps ten atmospheres, giving a continuous light for three or four months. The electric light has been adopted for a number of lighthouses, notably at the Isle of May, the Lizard, and Isle of Wight. The Eddystone and Bell Rock are the two most celebrated British lighthouses. The illustration shows a section of the Eddystone lighthouse, built by Sir J. N. Douglass in 1882. The manner in which the stones lock to one another is shown. The lamp is 133 feet above high-water level, and below it are the living-rooms, oil and general stores, and water-tank. Other important lighthouses on the British coast are those of Skerryvore and the Dhu Hartach, both on the western coast of Scotland; the Wolf Rock Lighthouse at the entrance to the English Channel; that of the Bishop Rock off the Scilly Islands; and the Chickens' Rock Light south of the Isle of Man.

Lightning, a flash of light resulting from a sudden discharge of atmospheric electricity. It may be a diffused reddish-white or violet flash, seemingly spread over a considerable extent of the sky (*sheet lightning*), or a zigzag or rather sinuous line of very brilliant light, resulting from a discharge between two clouds or between a cloud and the earth. *Heat lightning* is unaccompanied by thunder; it is now generally held to be the reflection from aqueous vapour and clouds of a discharge occurring beyond the horizon. Sometimes during a thunder-storm *globe lightning* is seen, the flashes taking the appearance of balls of fire falling slow enough for the eye to follow their movement. Experiments show that the duration of a flash of lightning is inconceivably small, in some instances not more than a millionth part of a second. The *spectrum* of lightning shows the presence of incandescent nitrogen, oxygen, hydrogen, and sodium. Certain electroscopic experiments seem to show that previous to a discharge between two clouds internal discharges are taking place in both. Lightning in passing through air and non-conductors, metallic rods, &c., exhibits all the phenomena of the passage of a very great quantity of electricity; it kills animals, splits trees and stones, and melts thin wires. Sometimes on entering the earth the lightning melts the siliceous substances in its way, producing the tubes called *fulgurites*. After a lightning discharge the peculiar odour of ozone may be observed, as in the neighbourhood of an electric

machine. Objects at a distance from a place of discharge may have previously been charged with electricity by the induction of the clouds; the distant discharge suddenly sets free this electricity so that it passes through the objects to the ground, producing a *return shock*; men and animals have often been killed in this way. — *Thunder* is due to the sudden disturbance of the air produced by a lightning discharge; the long rolling effect is perhaps due to echoes from the clouds, perhaps partly to there being a number of discharges at different distances from the observer. Sound travels at ordinary temperatures about 1100 feet per second, so that a thunder-clap from a distance of one mile would reach us in about five seconds. See *Conductor*, *Electricity*.

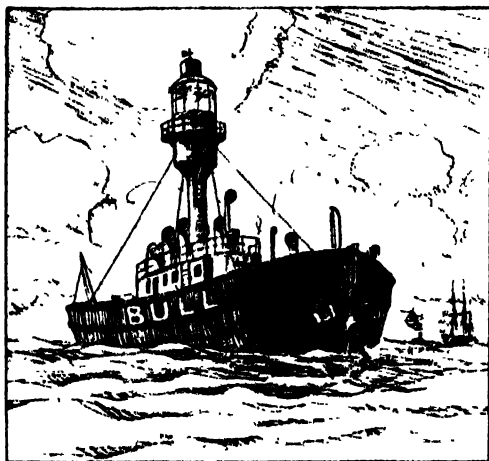
Lightning Arrester, a device installed in the central- and sub-stations of electricity supply schemes, and also on electric railway trains and tramcars, to protect the insulation of the plant from destruction by the action of the abnormal pressures due to lightning. They provide a suitable path to earth for these charges. In some cases the path consists of one or more air-gaps, with a carbon resistance in series. When the line becomes charged, the pressure is sufficient to jump the air-spaces on the gaps, and the main supply follows through the arcs produced. These arcs must be immediately broken, and the carbon resistance, keeping down the current, assists in this way, but a magnetic blow-out is customary. The principle of this action is the deflection of the current-conveying arc by a magnetic field. Another type makes use of two horns with an air-gap between them, which is of continuously increasing length from bottom to top. When the charge jumps the gap, the current passing is used in a coil to set up a magnetic field, which deflects the arc up the horns, thus increasing its length until it breaks.

Lightning-conductor. See *Conductor*.

Lights, in public worship. Light in Scripture is frequently referred to as a symbol of the Divine Presence, and in the rituals of the Jews and early Christians candles and candlesticks, or lamps, played an important part. Candles were lighted during the reading of the gospel, at baptisms, at funerals, and round the tombs of martyrs. This ceremony was forbidden to be practised in cemeteries by the Council of Elvira, A.D. 305, but it was continued in the churches not only for the persons buried within their walls, but for all who made provision for its observance on the anniversary of their death. The Feast of the Purification was popularly called *Candlemas*, on account of the numerous lights employed in its ceremonies. In the Roman Catholic Church lights are kept burning during the celebration of Mass. Candlesticks, and some-

times candles, are placed on the altar in many English churches, but they are not lighted for ceremonial purposes except by the ritualists. See *Ritualism*.—*Cf.* Vernon Staley, *Studies in Ceremonial*.

Light-ship, or **Light-boat**, a vessel, usually single-masted, serving as a lighthouse in posi-



Light-ship

tions where a fixed structure is impracticable. A lantern, fitted with Argand lamps placed in the foci of parabolic reflectors, is built on the masthead. They are less efficient and more expensive in maintenance than land lights.

Lignite, or **Brown Coal** (q.v.), compressed and altered vegetable matter intermediate in qualities between peat and coal. It occurs chiefly in the Cainozoic strata in many European countries, occasionally in thick beds, as in Germany and France, and is much used as fuel in Central Europe.

Ligny (lên-yê), a village of Belgium, not far from Charleroi. It is famous for the battle fought here between the French under Napoleon and the Prussians under Blücher, 16th June, 1815. Napoleon was victorious. See *Quatre-bras*; *Waterloo*.

Lig'ula, or **Lig'ule**, in botany, a strap-shaped petal of flowers of the ord. *Compositæ*; also the membrane which occurs at the base of the lamina of a grass leaf, and the tongue-shaped outgrowth from the base of the leaf of *Selaginella* and some other *Lycopods*. Hence the term *ligulate*, applied especially to the ray florets of *Compositæ*.

Liguori (lig-y-ô'rê), Alphonso Maria de, Italian prelate and founder of the Redemptorists, born 1696, and died 1787. In 1732 he founded a monastery, the members of which formed the Order of the Most Holy Redeemer. He was made

bishop by Clement XIII (1762), and retired in 1775. He was beatified in 1816, canonized in 1839, and created a doctor of the Church in 1871.

Liguria, one of the chief maritime compartimenti (divisions) of modern Italy, embracing the provinces of Genoa and Porto Maurizio, and including the towns of Spezia, Genoa, and S. Remo. Area, 2038 sq. miles; pop. 1,269,506. In the third century B.C. Liguria became a Roman province, was occupied by the Lombards in the seventh century, and partly fell to the House of Savoy in 1388. In the thirteenth century the present compartimento formed the Republic of Genoa.

Ligurian Republic. From 1797 to 1805 the Republic of Genoa existed as the Ligurian Republic, under a democratic Constitution granted by Bonaparte. In 1805 the republic was annexed to France, and from 1814 to 1860 formed part of the Kingdom of Sardinia.

Ligurian Sea, an arm of the Mediterranean, between Corsica and the Ligurian mainland. The northern extremity is the Gulf of Genoa.

Li Hung Chang, Chinese statesman, born in 1823, died in 1901, first distinguished himself by the suppression of the Taiping rebels (1863), in which he was assisted by 'Chinese' Gordon. He was subsequently Viceroy of the metropolitan province of Chihli, was also made Superintendent of Trade, and practically conducted the foreign policy of China. He arranged treaties with Peru and Japan, and one with France on the conclusion of the Franco-Chinese War in 1886. In 1895 he represented the emperor in the negotiations at the end of the war with Japan. The following year he travelled through Europe and the United States. The Boxer movement was successfully handled by him.—*Cf.* Sir R. K. Douglas, *Li Hung Chang*.

Lilac (*Syringa vulgaris*, nat. ord. *Oleaceæ*), a familiar fragrant-flowered shrub, 8 to 10 feet high, is a native of South-Eastern Europe and Asia, and was introduced into Britain some 300 years ago under the name pipe tree. There are several varieties, the most common colour of the flowers being lilac, but some are white.

Lilburne, John, political agitator and writer of pamphlets, born 1614, died 1657. For his attacks on the Church and on Cromwell he suffered many times at the hands of the law, and became something of a popular hero. Hume describes him as "the most turbulent, but also the most upright and courageous of men".

Lilliacææ, the lilies, a large natural order of monocotyledons. They are stemless herbs, or shrubs with a simple or branched trunk, with bulbous or fascicled roots. They have six hypogynous or perigynous stamens, with usually introrse anthers; a three-celled ovary, each cell

being usually many-ovuled; an entire style; and a capsular fruit. They are much more abundant in temperate climates than in the tropics, where they chiefly exist in an arborescent state. The lily, fritillary, hyacinth, Star of Bethlehem, tulip, dragon-tree, squill, aloe, onion, and garlic belong to this order.

Lilith (Heb., night fairy), according to Rabbinical legends, Adam's first wife, mother of giants and demons. She was believed to be especially hostile to children, and amulets were worn to ward off her influence.

Lille (lê; Fl. *Rijsel*), a town of France, capital of the department of Nord, near the Belgian frontier, and formerly in French Flanders. It is one of the chief manufacturing towns of France, and the chief fortress of the north-east. The Haute and Basse Dêcle, sluggish streams, traverse the town, and are connected by a canal, while the country around it is so flat that for about 1½ miles it can be laid under water. The manufactures include linen and cotton thread fabrics, fine woollen cloth, velvets, and carpets. The factories of Lille cover almost the whole range of textile goods. Chemicals, machinery, paper, and beet sugar are also produced. Founded in the eleventh century, Lille originally belonged to the Counts of Flanders, but eventually came under the domination of Burgundy, Austria, and Spain, successively. In 1667 it was taken by Louis XIV, and was fortified by Vauban. After a siege of several months it was reduced by Eugene and Marlborough in 1708, but was restored to France by the Peace of Utrecht in 1713. In 1792 it was ineffectually besieged by the Austrians. During the European War Lille was declared an open town (24th Aug., 1914), and it was occupied by German troops on 2nd Sept. They quitted it on 5th Sept., but bombarded the city on 11th Oct., and re-entered it on the 13th. Lille remained in German possession till 17th Oct., 1918. Pop. 217,807.

Lillibulle'ro, originally, it is said, a watchword of the Irish Roman Catholics in their massacre of the Protestants in 1641; afterwards, the refrain and name of a political song, composed in or about 1687, which became popular among supporters of William III. The words are dreadful doggerel.

Lillo, George, English dramatist, born 1693, died 1739. He is chiefly remembered for his play *The London Merchant, or the History of George Barnwell*, a bourgeois tragedy with a moral attached. He adapted the partly-Shakespearean play *Pericles*, and wrote a new play on the subject of *Arden of Feversham*.

Lily, a genus of plants, nat. ord. Liliaceæ. The root is a scaly bulb; the leaves simple, scattered, or verticillate; the stem herbaceous, simple, and bearing at the summit very large

and elegantly formed flowers. The flower consists of six petaloid sepals, the calyx and corolla being alike in form and colour. There are many species, those best known in Europe being the white, orange, and scarlet lilies, the tiger lily, &c. The common white lily (*Lilium candidum*) is a native of Syria, Persia, and other Eastern countries. The finest American species is the *L. superbum*, which grows in marshes to the height of 6 or 8 feet, bearing reflexed orange flowers spotted with black. A well-known Japanese lily (*L. auratum*) is one of the noblest flowering plants in existence, and highly fragrant. *L. giganteum* grows to the height of 12 feet. In the Middle Ages and in modern times the white lily has been the emblem of chastity; hence the Virgin Mary is often represented with a lily in her hand or by her side.

Lily-of-the-valley (*Convallaria majalis*), a plant of the nat. ord. Liliaceæ, distinguished for its beautiful fragrant bell-shaped flowers. It is found in Europe, Asia, and North America. The flowers, generally white, form a terminal unilateral raceme on a curved stalk.

Lima, capital city of Peru, founded by Francisco Pizarro in 1535, lies at the foot of granite hills, on the intermittent stream Rimac, whose name was corrupted into Lima. The port is Callao, 7 miles distant. The city shows the usual chess-board form, but has more of an old Spanish aspect than Buenos or Santiago. What appear to be substantial houses are only of brick, adobe, or timber. The University of Lima is the oldest in the New World; there are many churches and convents, and a very large bull-ring. Lima is connected with Callao by both steamer and rail. In Jan., 1881, the town capitulated to the Chilians, who occupied it for two years. Pop. 715,000.

Limbourg, or Limburg, a province of Belgium, separated by the Maas from Dutch Limburg; area, 931 sq. miles; pop. (1919), 300,931. Hasselt is the capital.

Limburg, a province of Holland, partly intersected by the Maas; area, 847 sq. miles; pop. (1920), 450,012. Agriculture and cattle-rearing are the chief occupations, and there is a large export trade in butter and cheese. The capital is Maastricht. Before 1839 Limburg, with Limburg, Belgium, formed the duchy of that name.

Limburg, a city of Hesse-Nassau, Prussia, known as Limburg-on-Lahn. The cathedral dates from the tenth century, but has been restored. During the European War Limburg had an internment camp. Railway rolling-stock and cloth are manufactured. In the Middle Ages Limburg existed as a town (Electorate of Trêves), and passed to Hesse-Nassau in 1803. The *Limburger Chronik* is an important historical work on fourteenth-century Rhineland. Pop. 10,095.

Lime, CaO , the oxide of the metal calcium. It does not occur free in nature, but in the form of salts is widely distributed, more especially as the carbonate CaCO_3 (see *Calcite* and *Limestone*). The pure oxide is obtained when Iceland-spar or finest marble is heated to bright redness in an open vessel. Combined with carbonic, sulphuric, and phosphoric oxides it constitutes large rock masses, and even mountains; as sulphate or carbonate it is present in sea and other waters in solution; it is a constituent of good soils and of a great number of minerals; and is the essential foundation of the hard parts of animals and of certain algal plants.

Ordinary lime, or quicklime, is manufactured on a large scale by burning chalk or limestone. The operation is conducted in brickwork kilns, the lumps of limestone being mixed with coal or other combustible material. In modern kilns the process is continuous, and fresh limestone and coal are supplied at the top as the lime is removed at the bottom. The lime thus obtained contains various impurities, such as silica, alumina, and iron compounds. During the process of burning, enormous quantities of carbon dioxide are evolved, and are usually allowed to escape into the air. If much clay is present in the limestone, care is required to prevent the mass from fusing, when it is termed *dead-burnt*. Lime readily absorbs both moisture and carbon dioxide from the atmosphere, and should be kept in air-tight tins. Pure lime is a soft, white substance, of the specific gravity of about 3.18. It is quite infusible except at the temperature of the electric furnace, but when heated in the oxyhydrogen blowpipe it becomes white-hot and incandescent. When water (1 part) is added to quicklime (3 parts) it is rapidly absorbed, with the evolution of much heat and vapour. This constitutes the phenomenon of slaking. The heat proceeds from the combination of the water with the lime, forming *hydrate of lime* or *calcium hydroxide*, Ca(OH)_2 , which is a white powder containing 75.7 parts of lime to 24.3 parts of water. The hydroxide is sparingly soluble in cold water, but still less soluble in hot; the saturated solution at the ordinary temperature contains 0.14 per cent of the hydroxide, and is known as *lime-water*. This solution is astringent and somewhat acrid in taste, has a distinct alkaline reaction, turning red litmus blue, and rapidly absorbs carbon dioxide from the air, yielding a precipitate of calcium carbonate. When raised to a bright red heat, slaked lime is decomposed into water and calcium oxide. Chlorine combines directly with lime, forming the very important substance, used in bleaching, called *chloride of lime* or *bleaching-powder*. It is formed by passing chlorine gas over slaked lime. Chloride of lime is also used as a disinfectant.

The uses of lime are very numerous. In the manufacture of basic Bessemer steel (see *Steel*) it combines with phosphorus and other impurities and forms about one-half of what is called 'Thomas slag', which, when ground, makes a cheap and efficient fertilizer; it is employed in the early stages of leather dressing to remove hair, fat, &c., from the hides; it is used in metallurgy as a flux; for neutralizing acids; for making all varieties of mortars and cements; in agriculture for manurial purposes, the main effects being due to its rapid conversion into the soluble calcium bicarbonate in the soil; in the chemical laboratory as a drying agent; for decomposing ammonium salts and generating ammonia; and in the *materia medica*, chiefly as an antacid.

Lime, or Linden (Tilia, nat. ord. Tiliaceæ), a large tree, with alternate, simple, and cordate leaves, and sweet-scented flowers, disposed on a common peduncle. The common linden (*T. europæa*) is a well-known tree. The inner bark of all the species is very tenacious; it is called *bast*, and mats are made of it in Russia in large quantities. The wood is rather soft, close-grained, and much used by turners. The American lime, or bass-wood (*T. americana*), is also a large and beautiful tree.

Lime (*Citrus medica, acida*), a small globular-shaped lemon, the fruit of a shrub about 8 feet high. It is a native of India and China, but was introduced into Europe long before the orange,



Lime (*Citrus medica, acida*)

and is now extensively cultivated in the south of Europe, the West Indies, and some parts of Southern America. The fruit is agreeably acid, and its juice is employed in the production of citric acid, and in beverages.

Limerick, a seaport-city and capital of Limerick County, Ireland; on the Shannon at the head of the estuary. It consists of three

parts: English town (on King's Island), Irish town, and Newtown Pery (modern). The principal buildings are the episcopal cathedral of St. Mary, the Roman Catholic cathedral of St. John, and a castle built by King John. Limerick is the leading port on the west coast for the shipment of dairy produce. It was the last stronghold of King James at the Revolution; and the treaty stone, near Thomond Bridge, still marks the spot where the famous Treaty of Limerick was signed in 1691. Pop. 38,518.

Limerick, county of Ireland, province of Munster; area, 680,842 acres. The principal river is the Shannon, the estuary of which forms part of the northern boundary, the county is watered by the Maigue, Deel, and Mulkear. Sheep-rearing and dairy farming are general, and quantities of farm produce are exported.

Limestone is one of the various forms in which calcium carbonate (carbonate of lime) occurs naturally. The crystallized natural forms of the carbonate are calcite and aragonite (q.v.).

When pure, it has the composition CaCO_3 , or 28 parts of lime to 44 parts of carbon dioxide. Most varieties of limestone are highly impure, and contain magnesium carbonate, silica, alumina, and iron compounds. They are comparatively soft and can be scratched with a knife, and all, except highly magnesian varieties, effervesce when a drop of dilute acid or vinegar is added. When pure, the rock dissolves completely in dilute hydrochloric or nitric acid. Limestone belongs to what is termed the sedimentary rocks, and its parent part owes its origin to the deposition of the remains of sea organisms on the bottom. In many cases well-preserved and sometimes the skeletons of marine organisms are found imbedded in the limestone (*fossils*). Limestones are very common, and form enormous rock masses on the surface of the earth; as they are harder than the associated clays, and have well-marked joints perpendicular to the bedding, they often form characteristic escarpments and mountain edges. As a rule limestone has a crystalline texture and occasionally a granular appearance. Different specimens vary considerably in colour and also in specific gravity, namely, from 2.5 to 2.9. A mixture of carbonate of calcium with dolomite (calcium magnesium carbonate) is frequently met with, and is known as *dolomitic* or *magnesian limestone*. A variety of very fine-grained compact limestone is used in lithography, the best being that obtained near Pappenheim and Solnhofen, in Bavaria. Varieties of limestone are: (1) *Chalk*, a white earthy rock, which occurs in thick beds in the south of England, and which consists in large part of the remains of minute

sea organisms known as foraminifera; (2) *Oolite* or *roestone*, a white or yellow granular rock mass, which forms part of the Jurassic beds of the Midlands and eastern portions of England. See *Lime*; *Chalk*; *Geology*; &c.

Limit, in mathematics, a fixed value to which a variable approximates as closely as may be required. As an example, let a variable take in succession all values which have the form of the reciprocal of a positive integer, i.e. the values $1, \frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \dots$. In this case the limit of the variable is 0; for the n th value is $1/n$, and this and all succeeding values differ from 0 by less than any assigned number if we make a suitable choice of n ; e.g. $1/n, 1/(n+1), 1/(n+2), \dots$ are all less than $1/10^6$ if n is $10^6 + 1$. A precise definition of *limit* is given, with ample illustration, in works on the calculus (q.v.).—Cf. F. F. P. Bisacre, *Applied Calculus*.

Limitation, in English law, a certain time, assigned by statute, within which an action must be brought, varying according to the subject of action. This matter is regulated by certain Acts of Parliament, called Statutes of Limitation. According to those now in force, actions are limited as follows: actions for the recovery of land, rent-charge, or redemption of mortgages, to twelve years after right accrued; of debt or covenant, if founded on a deed, to twenty years, on less formal agreement, to six years after breach; bills, promissory notes, trade accounts, arrears of rent or dowry, to six years. Actions for slander are barred after two years; actions on penal statutes, if brought by the party injured after two years, if brought by a common informer after one year. Actions by the Crown relating to land are limited to sixty years. An action for assault, battery, &c., must be brought within four years, an action for death by accident within one year. In a charge of murder the injured person must have died within a year and a day of the time when the injury was inflicted. These limitations do not apply to prosecutions for crime, which may be instituted at any time, nor do they apply to actions against a trustee for any fraud or fraudulent breach of trust to which the trustee was privy, or for the recovery of trust property retained by the trustee or converted to his own use. If the person to whom a right of action has accrued is under disability, e.g. infancy or insanity, or if the person against whom it has accrued is at the time beyond the seas, the general rule is that the period of limitation does not begin to run until the disability has ceased or the absentee has returned, but the utmost limit in actions relating to land is thirty years, however many disabilities there may be. The American law is mainly based on the English statutes. For the law of limitation in Scotland see *Prescription*. The term limitation is also

applied to those words in a deed or will which define or 'limit' the extent of the interests given by it.

Limited Liability Companies. A feature of recent years has been the rapid growth in the number of companies incorporated with limited liability. The statute law concerning such companies is embodied mainly in the Companies (Consolidation) Act, 1908. By virtue of that Act no association of more than ten persons can be formed for the purpose of banking, or of more than twenty persons for the purpose of carrying on a business for gain unless registered under the Act, or formed in pursuance of another statute or letters patent, or engaged in working mines within the Stannaries. Seven persons may, however, register themselves as a company.

The Act deals with three kinds of companies: (1) unlimited companies, (2) companies limited by guarantees, and (3) companies limited by shares. The first mentioned are extremely rare, as each member is liable for the whole debts of the company (as in an ordinary partnership), but only during the period of his membership and for one year thereafter. Of the second class there are also few examples. The liability of each member is limited to the amount which he has undertaken to contribute to meet the liabilities of the company in the event of a winding-up, and continues so long as he remains a member and for a further year. The third class is of the utmost importance and frequency. The members' liability is limited to the amount (if any) remaining unpaid upon the shares held by them. If the shares are fully paid, there is no further liability, however deeply involved the company may be.

A registered company is a corporate body, capable of entering into contracts, and of suing and being sued in its corporate capacity, having perpetual succession and a common seal, and with power to hold lands. It is a *persona* or being distinct from the persons composing it, who may change from time to time without affecting the legal *persona* of the company. Its 'nationality' is determined by the place of registration irrespective of the nationality of the members.

Companies limited by shares are divided into two classes—'public' and 'private'. The latter class of company is defined by the above Act and the Companies Act, 1913, as one which by its Articles (a) restricts the right to transfer its shares; (b) limits the number of its members (exclusive of persons who are in the employment of the company, and of persons who, having been formerly in the employment of the company, were while in such employment and have continued after the determination of such

employment to be members of the company) to fifty; and (c) prohibits any invitation to the public to subscribe for any shares or debentures of the company. A private company has certain privileges denied to a public company. Thus, for example, it need not have more than two members; it need not file with the Registrar of Joint Stock Companies a prospectus or statement in lieu thereof or an annual balance sheet; and it can commence business immediately on incorporation without waiting until a specific minimum number of shares have been subscribed and the directors have paid on their qualification shares the cash due on application and allotment.

Fully 75 per cent of the companies incorporated with limited liability are private companies. The advantages of conducting business through this medium are numerous and well-recognized. For example, there is the paramount consideration of the limitation of liability for debts, already referred to. Then again, facilities for borrowing are increased—debentures or debenture stock secured on the company's undertaking may be issued, or advances may be obtained on security of the amount unpaid on the shares (the 'uncalled capital'); further capital is more easily obtained owing to the limitation of liability, as in the event of adversity only the capital invested can be lost; the business is more readily carried on or disposed of in the event of death; new members are assumed by the simple method of issuing or transferring shares, &c.

A company is incorporated by filing with the Registrar of Joint Stock Companies in London, Edinburgh, or Dublin, a Memorandum of Association and (generally, and, in the case of a private company and one limited by guarantee, always) Articles of Association, along with certain subsidiary documents. The Memorandum and the Articles must be signed by seven (if the company is a private one, two) persons, who must each subscribe for at least one share. These signatories are members of the company, and must be entered in the Register of Members as such. Any person—bankrupt, married woman, alien, or infant—may sign.

The Memorandum of Association is the charter of the company, and too great care cannot be exercised in its preparation. By law it must contain the following particulars:

(1) The name of the company, which must not so resemble that of another company as to be likely to deceive, and which must end with the word 'Limited' (but this may be dispensed with by the Board of Trade if the company is not carried on for gain). The name may be changed by special resolution and with consent of the Board of Trade.

(2) The part of the United Kingdom where

the registered office is to be situated (England, Scotland, or Ireland).

(3) The objects of the company. This is a most important clause, as on it depend the powers of the company, any act not authorized by it being *ultra vires* and null. Extremely wide general powers are always taken, as the 'objects' clause can be altered only in special cases and with the sanction of the court.

(4) A declaration that the liability of the members is limited.

(5) The amount of the nominal capital of the company and its division into shares (unless the company is limited by guarantee and has no share capital). Different classes of shares may be created, e.g. preference, ordinary, and deferred, of different amounts and with different rights both as regards dividends and as regards repayment of capital in the event of a winding-up. The nominal capital may be increased or reduced by resolution, but the confirmation of the court is also necessary to any reduction.

The memorandum of a company limited by guarantee must add a declaration of the undertaking mentioned *supra*.

The Articles of Association are the regulations of the company for the management of its internal affairs. If Articles are not registered, Table A of the Act of 1908 applies; and the table also applies so far as not excluded or modified by any Articles registered. The Articles deal with the powers and duties of directors, calls on shares, transfer and forfeiture of shares, payment of dividends, meetings, voting rights, the accounts, &c. Power to alter the capital must be contained in the Articles before such alteration can be effected. The Articles may be altered by special resolution for the benefit of the company within the powers of the Memorandum.

The business of a company is usually managed by directors. They must not make secret personal profits, nor can they delegate their powers unless authorized by the Articles of Association.

A general meeting of the company must be held annually. An extraordinary general meeting may be called at any time by the directors or by the requisite number of members. Resolutions passed at such meetings may be of three classes: (1) ordinary, for which a bare majority suffices; (2) extraordinary, passed by a majority of not less than three-fourths of the members present in person or by proxy and entitled to vote; and (3) special, passed as an extraordinary resolution and confirmed by a majority at a subsequent meeting held not less than fourteen days nor more than one month thereafter. In cases (2) and (3) previous notice of intention to propose the resolution must have been given to

the members. The proceedings at meetings must be minuted, and the minutes, if signed by the chairman of that or the next succeeding meeting, are evidence of the proceedings.

The existence of a company is ended by the process of winding-up. This may be (a) by order of the court; (b) by the voluntary act of the company; or (c) by voluntary act and under supervision of the court. A company need not necessarily be in difficulties in order to wind-up. See *Liquidator*.—BIBLIOGRAPHY: N. Lindley, *Treatise on the Law of Companies*; F. B. Palmer, *Company Precedents*.

Limnæa, a genus of freshwater snails, having a lung sac instead of gills. They have the power of floating on their back, and crawling along the surface film. They are found in most parts of the world, and occur fossil, especially in the Purbeck and Wealden.

Limnanthes, a genus of Geraniaceæ. *L. Douglasii*, a hardy annual with yellow and white sweet-scented flowers, provides excellent 'fodder' for bees.

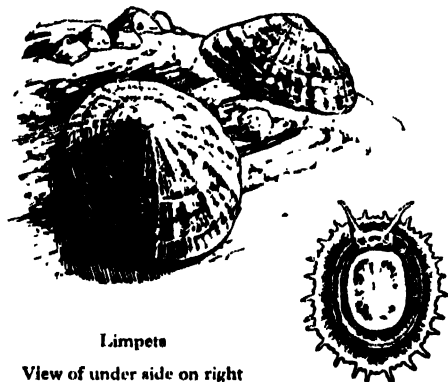
Limoges (li-mōzh; ancient *Augustoritum Lemovicum*), a town of France, capital of the department of Haute-Vienne, and former capital of Limousin. The principal building is the cathedral of St. Étienne, commenced in 1273, left partially completed in 1550, and completed between 1875 and 1890; artistic porcelain, known as Limoges ware, is manufactured; there are also wool and cotton spinning-mills, cloth-factories, foundries, paper-mills, and extensive shoe- and clog-making establishments. Limoges was originally the capital of the Gallic tribe the *Lemovices*. Pop. 92,181.

Limonite (Gr. *limōn*, a meadow), a very important ore of iron, varieties of which are bog iron ore and brown hematite. It is a hydroxide of a brownish colour, occurring in mammillated or botryoidal masses, and found in all iron-bearing districts. Its frequent fibrous structure is probably due to a tendency to crystallize as gothite (q.v.), with the loss of some of its adsorbed water. Its composition is usually near $2\text{Fe}_2\text{O}_3 \cdot 3\text{H}_2\text{O}$, yielding 56 per cent of metallic iron.

Limousin (li-mō-san), ancient Lemovices, a pre-revolutionary province of France, on the area now occupied by Haute-Vienne, Corrèze, Creuse, and parts of Dordogne and Charente.

Limpet, a sea-snail which clings to rocks partly by the adhesive powers of its broad disc-like foot. The common limpet (*Patella vulgata*) is often found ensconced in a shallow pit excavated out of the rock, which it has made or rasped out by the edge of its conical shell. From this pit the limpet, when covered by the tide, makes short journeys in quest of its food, which consists of Algae, and which it rasps by

means of a long ribbon-like tongue covered with numerous rows of hard teeth. The limpet is used as bait, and is eaten by the poorer classes



of Scotland and Ireland. Some tropical species attain an immense size.

Limpo'po, or **Crocodile River**, a river of Southern Africa, which rises in the Magaliesberg, Transvaal, near Pretoria, and forms the boundary of the Transvaal for some distance, falling into the Indian Ocean north of Delagoa Bay; length, about 1100 miles.

Lina'cese, the flax family, a small natural order of polypetalous dicotyledons, those in temperate and southern regions being herbs, while the tropical representatives are trees or shrubs. They are principally characterized by their regular flowers, with imbricate glandular sepals having a disc of five glands outside the staminal tube; the ovary is three- to five-celled, with two ovules in each cell; the albumen is fleshy; the leaves are simple, usually stipulate, rarely opposite. The tenacity of the fibre and the mucilage of the diuretic seeds of certain species of *Linum*, such as the common flax (*L. usitatissimum*), are well known.

Lina'cre, or **Lynacer**, Thomas, English savant, born at Canterbury about 1400, died 1524. Educated at Oxford, he visited Italy, and on his return became tutor to Prince Arthur (son of Henry VII). He was ordained priest (1520), and in 1518 he founded the Royal College of Physicians, of which he continued president till 1524. He made a Latin translation of the works of Galen, a work which was particularly praised by Erasmus. With Grocyn and Latimer, Linacre was the first to teach Greek at Oxford, where Erasmus and Sir Thomas More were among his pupils. He was buried in St. Paul's Cathedral.

Lina'res, a town of Spain, province of Jaen, the chief town of a district rich in lead-mines. Pop. 37,039.

Linares, an inland province of Chile; area, 3960 sq. miles; pop. (1919), 129,851. Stock-raising is the main industry.

Lina'ria, a genus of gamopetalous, dicotyledonous plants of the nat. ord. Scrophulariaceae. Seven or eight species inhabit Britain, where they are popularly known as *Toad-flax*.

Lincoln, Abraham, sixteenth President of the United States of America, born in Kentucky 1809, died 1865. On the outbreak of the Black Hawk War in 1832 he joined a volunteer company, and became captain. He opened a country store, was appointed postmaster of New Salem, Illinois, began to study law, and at the same time turned amateur land-surveyor. In 1834 he was elected to the Illinois legislature, to which he was again returned at the three following biennial elections, and in 1836 he was licensed to practise law. In 1846 he was elected to Congress for the central district of Illinois, and voted steadily with the Antislavery party. In 1849, and again in 1858, he made unsuccessful attempts to enter the Senate. On the 16th of May, 1860, the Republican National Convention met at Chicago. Lincoln was nominated as a candidate for the presidency, gaining a majority on several votes and being eventually accorded the appointment unanimously. The Southern States, exasperated at this defeat, and alarmed at the aggressive antislavery policy which many of the leading Republicans had embraced, refused to confirm Lincoln's election, and followed one another in secession. Lincoln was elected in Nov., 1860, and he assumed office on the 4th of March, 1861. On the 4th of February the Southern Confederacy had been constituted, and on the 14th of April Fort Sumter was captured by the Confederates. The events of the Civil War during the next four years in Lincoln's career belong to the history of the United States. Lincoln's persistence in raising and pouring in fresh troops after every disaster finally enabled the Federal Government to subdue the secession. The toleration of slavery was always in Lincoln's opinion an unhappy necessity; and when the Southern States had by their rebellion forfeited all claim to the protection of their peculiar institution, it was an easy transition from this view to its withdrawal. The determination of the Northern States to pursue the war to its conclusion on the original issue led to the reelection of Lincoln as President in 1864. The decisive victory of Grant over Lee on 2nd April, 1865, followed by the surrender of the latter, had just afforded the prospect of an immediate termination of this long struggle, when, on the 14th of the same month, President Lincoln was shot in Ford's Theatre, Washington, by an assassin named John Wilkes Booth, and died on the following day.—BIBLIOGRAPHY: W. M.

Thayer, *Abraham Lincoln, the Pioneer Boy, and how he became President*; J. G. Nicolay, *A Short Life of Abraham Lincoln*; J. A. Sharp, *Abraham Lincoln*; F. S. Paradise, *Abraham Lincoln, Democrat*.

Lincoln (ling'kon), a city, county, and municipal borough of England, and county town of Lincolnshire. The principal building is the cathedral, commenced about 1073, completed in 1092, and restored since 1862, chiefly in the early English, but partly also in later styles, with a tower over 200 feet high, in which is the famous bell known as 'Great Tom of Lincoln', cast in 1010, cracked in 1827, and since recast into a new bell. Other conspicuous buildings are the Guildhall or Stonebow (of the time of Richard III), the remains of the castle founded by William the Conqueror, the old episcopal palace, and the Roman arch spanning Hermin Street. The manufacture of agricultural implements and machinery forms the chief branch of industry. Lincoln has been identified with the Roman *Lincoln Colonia* (in Bede it occurs as *Lind-colina*). On the departure of the Romans it became the capital of the Saxon kingdom of Mercia, and during the early fourteenth century Parliaments frequently assembled in the town. Pop. (1921), 66,020.

Lincoln, a city of the United States, capital of Nebraska, and county town of Lancaster. It is an important grain centre, well provided with elevators, and served by three railways. There is a large stockyard and packing-houses. Pop. 47,000.

Lincoln, a mountain of the Park Range, Colorado, United States, reaching an altitude of 14,300 feet.

- **Lincoln College**, a college of Oxford University founded in 1427 by Richard Fleming, Bishop of Lincoln. The hall was built in 1439, and the chapel in 1631. The existing statutes were enacted under authority of a Parliamentary Commission in 1855. The foundation usually consists of a rector, twelve fellows, and fourteen scholars. It was at Lincoln College that John Wesley started his evangelistic work.

Lincolnshire, a large eastern maritime county of England; area, 1,705,293 acres. The surface lies generally below the level of the sea, being protected by embankments. In a few places the fens and marshes continue nearly in the natural state, but round the Wash a great deal of very fine land has been reclaimed. Some of these fens were banked and drained by the Romans, but after their departure the sea returned, and large tracts were covered with beds of silt containing marine shells. Lincolnshire has long been celebrated for its breed of horses, cattle, and sheep. In the best parts of the fens and marsh under tillage the crops chiefly

cultivated are oats and wheat. Principal rivers: Trent, Witham, Welland, and Ancholme. The Witham is navigable from Boston to Lincoln; and the county is intersected by an intricate network of canals and dikes. Lincolnshire is divided into three parts—Holland, Kesteven, and Lindsey. Pop. (1921), 602,105.

Lincrusta, a stiff decorative sheet, invariably of an embossed type, and often termed Lincrusta Walton from the inventor's name—Walton. It is made from a mixture of cellulose pulp, cork, linseed oil, resin, and the like. The sheets are moulded while the substance is plastic, thus producing high-relief effects. The finished product is of a compact nature, waterproof and durable, and is used extensively as a high-class decoration for walls, panels, or borders.

Lind, Jenny, soprano vocalist, born at Stockholm 1820, and died at Malvern 1887. She made her debut at the Court Theatre, Stockholm, in 1838, studied under Manuel Garcia at Paris, securing an engagement in Berlin (1844) through the influence of Meyerbeer. Her appearance at Covent Garden (1847) was the signal for a scene of unprecedented enthusiasm, and she created a furore in the operas of *Sonnambula*, *Lucia*, *Norma*, and *Figlia del Regimento*.

Lindsay, or **Lyndsay** (lind'zā), Sir David, an ancient Scottish poet and Lyon King-of-Arms, usually described as 'of the Mount', an estate near Cupar in Fife, was born about 1490, died 1555. After studying at St. Andrews, he became page of honour to James V, then an infant (1509). In 1528 he produced his *Dreme*, an allegory written in the seven-line stanza of Chaucer, and in the following year presented his *Complaynt to the king*. In 1530 he was inaugurated Lyon King-of-Arms and knighted, and in 1531 wrote a drama entitled a *Satyre of the Three Estutis*, followed in 1536 by his *Answer to the King's Flyting*, and by the *History and Testament of Squire Meldrum* in 1538. His last work, *The Monarchie*, was finished in 1553. For more than two centuries Lindsay was the most popular poet in Scotland. His satirical attacks on the clergy in some degree paved the way for the Reformation. A complete edition of the works of Lindsay was published by George Chalmers in 1800, and one by David Laing (with a glossary by John Small) appeared in 1879 in 3 vols.—Cf. T. F. Henderson, *Sir David Lindsay and the later Scottish 'Makaris'*.

Lindsey, one of the three divisions of Lincolnshire, forming an administrative county under its own county council, and divided into four parliamentary divisions: Louth, Brigg, Horn-castle, and Gainsborough.

Linen is a term which should be used only for those fabrics made entirely from flax yarns (line or tow). It is not unusual, however, to

hear the term applied to linen-finish fabrics when the latter contain a certain proportion of cotton; such a use of the word is, in reality, a misnomer. Linen fabrics appear amongst many ancient types of woven material, and several very fine linens have been found which were used centuries ago to wrap embalmed bodies, in Egypt. When fully-bleached, the fabrics are exceedingly smart looking and durable. Linen fabrics possess a surface which has not yet been equalled by any other yarns made from vegetable fibres, and hence they still hold the premier place for kitchen and table use, and especially in the more valuable goods. Their use as so-called bed-linen has been successfully challenged by fabrics made from cotton and other fibres, but this substitution is due solely to the fact that cotton fabrics are much cheaper than linen ones so far as first cost is concerned; nevertheless, linen sheets are very durable, very handsome, and always highly prized. Flax yarn has been spun, and linen fabrics woven from it, in practically every known country in the world, and, prior to the great advance of the cotton industry, formed the chief vegetable material for all kinds of household textures, and for a large proportion of wearing apparel. The looms for weaving linen differ only slightly from those used for cotton and other fabrics, but, on the other hand, flax preparing and spinning machinery as a whole differs essentially from the corresponding cotton machinery because of the great difference in the lengths of the two fibres; flax fibres are 2 to 3 feet in length, whereas cotton fibres are only $\frac{1}{4}$ to 2 inches long. There are somewhat similar functions to perform, however, in corresponding machines for both industries, and in these instances the operations differ only in detail. (See *Spinning*; *Weaving*.) There are hundreds of different kinds of linen fabrics, of which the ordinary household and table linen form perhaps the chief. Within the last few decades a great quantity of plain and damask linens of various kinds has been woven for subsequent additional ornamentation by means of hem-stitching and embroidery machines, and for similar decoration by hand. In these islands the chief centres are Belfast and district in Ireland, and Dunfermline and Perth in Scotland, for fine linens, both plain and damask; medium-sett linens are made in north-east of Ulster in Ireland, Leeds, Barnsley, and Knaresborough in England, and in the East of Fife, Scotland; while sail-cloth, canvas, and the like are made in Arbroath, Dundee, Aberdeen, and Leith in Scotland, and in Dorset and Somerset in England.

Ling (*Molva vulgaris*), a species of sea-fish belonging to the cod family (Gadidae), and measuring from 4 to 6 feet in length. It abounds around the British coasts, and is caught with

hook and line, and preserved in immense quantities in a dried state. From the beginning of February to May the ling is in highest perfection, the spawning season commencing in June.

Lingam, among the Hindus, the emblem of the male generative power of nature. It is worshipped either alone or in conjunction with the *yoni* or female generative power. The worship of the lingam alone, or of the lingam and yoni, mark different sects of Saivism. The emblems are placed in temples or in the open fields all over India.

Lingua Franca, a polyglot form of Italian, used for intercourse among Mediterranean traders in the same way that 'pidgin' English is used in China and on the 'Coast'. Any jargon employed for this purpose is loosely termed a *lingua franca*. See *Malta*.

Lin'gula, a genus of lamp-shells (Brachiopoda), belonging to the family Lingulidae, that has survived with but little change from the Cambrian period. The members of the genus inhabit the Indian Archipelago and the Australasian seas.

Lingula Flags, a series in the Welsh Cambrian system, especially marked by the abundance of the brachiopod *Lingulella*.

Linköping (lin-cheup'ing), a city of Sweden, capital of the län of Östergötland, on the Stång, near Lake Roxen. There is a cathedral built between 1150 and 1400, a fifteenth-century castle, and a library rich in rare editions of the Bible. In its immediate vicinity, in 1598, was fought a battle in which Sigismund was defeated by his uncle, who shortly after became King of Sweden as Charles IX. Pop. (1920), 26,300.

Linlithgow, John Adrian Louis Hope, first Marquess of, was born in 1800, and died 1908. He was the seventh Earl of Hopetoun in the peerage of Scotland, and was made Governor of Victoria (Australia) in 1880, vacating the post in 1895. In 1900 he became first Governor-General of Australia, and was made a Privy Councillor on his return in 1902. Until 1905 he was Secretary for Scotland and Keeper of the Great Seal of Scotland, and he was elevated to a peerage of the United Kingdom in 1902 with the title of Marquess of Linlithgow. On his death he was succeeded by his son, Victor Alexander John Hope.

Linlith'gow, an ancient royal and municipal burgh of Scotland, county town of Linlithgowshire, in a hollow along the southern bank of Linlithgow Loch. It consists principally of one irregular street, about 1 mile long. Among historical buildings are the palace, now a ruin, where James V and Mary Queen of Scots were born; and the church of St. Michael, a sixteenth-century Gothic edifice. It was in the High Street of Linlithgow that Hamilton of Bothwellhaugh assassinated the Regent Murray in 1570. Pop. 3880.

Linlithgow, County of, or West Lothian,

county of Scotland, with 17 miles of seaboard upon the Firth of Forth; area, 70,861 acres. It is one of the richest in minerals of the counties of Scotland, coal, shale, iron, freestone, and limestone being worked. Oil-refining (shale) is carried on at Bathgate and Uphall. The Almond and Avon are the principal rivers. Linlithgow, Bathgate, Bo'ness, Broxburn, and Armadale are the chief towns. Pop. 83,906.

Linnæa, a genus of plants of the nat. ord. Caprifoliaceæ (honeysuckles). It contains but one species (*L. borealis*), a creeping evergreen plant found in woods and in mountainous places in Scotland and other northern countries, including North America as far south as Maryland, bearing two beautiful drooping fragrant bell-shaped pink flowers on each flower-stalk. The plant was an especial favourite with Linnaeus, and was named in honour of him by Gronovius.

Linnean Society, a scientific (biological) society of England, with head-quarters in London, instituted in 1788 by Dr. (afterwards Sir) James Edward Smith, and incorporated in 1802, for the promotion of the study of botany and zoology. It has an excellent library, a museum, and herbarium, the nucleus of which was formed by the collections of Linnaeus himself. Fellows take the initials F.R.S. The society annually awards a gold medal to a botanist or a zoologist.

Linné (lin'nä), Karl von, commonly called **Linnaeus**, Swedish botanist, was born at Rashult, Sweden, 1707, and died at Upsala 1778. The son of a clergyman, he was educated at Wexio, and showed an early interest in botany. In 1727 he entered the University of Lund, where his botanical tastes were encouraged. In 1728 he removed to Upsala, where he became assistant to Professor Rudbeck and supervised the botanic garden. His *Bibliotheca Botanica* was published in 1738. He became professor of medicine at Upsala in 1741, and then of botany and natural history. In 1753 he was made a knight of the Polar Star and ennobled. The Linnean system of botanical classification was paramount until within comparatively recent times. Linné was eminent in all the sciences of his time.

Linnet, a small singing bird of the finch family, *Linola cannabina*. Its general plumage is brownish, the top of the head and breast being reddish in the breeding season. It is one of the commonest of British birds, everywhere frequenting open heaths and commons, and breeding in the furze and other bushes. They are cheerful and lively birds, and very sweet and pleasing songsters.

Linoleum is the name given to an exceedingly useful and durable kind of floor-covering. The foundation for practically all linoleums is some kind of jute hessian cloth, termed linoleum backing or linoleum floorcloth. These cloths

contain from ten to twelve threads and picks per inch, are usually 2 yards or 4 yards in width, and several hundred yards in length; indeed, the length occasionally runs into four figures. For economic reasons it is necessary to have long lengths, otherwise excessive waste would result in the covering of these cloths with the substance which really constitutes the linoleum. Oxidized linseed-oil and other oily and resinous substances are mixed with ground cork, and this mixture is applied in layers, and by mechanical means, to the surface of the above-mentioned cloth backing. The thickness of the finished article varies, but, in general, it approximates to $\frac{1}{4}$ inch. The upper surface of the linoleum may appear in a natural brownish colour, or it may be decorated, wholly or partially, and in stripe-form or all-over figured effect, by bright colours; these, when simply applied as a kind of paint to the surface of the linoleum, gradually wear off under constant use. On the other hand, the coloured compositions of inlaid linoleums are solid, so that the pattern remains intact however much the covering is worn. The so-called wax-cloths and American cloths are somewhat similar in appearance to linoleum (the American cloths being usually of a self-coloured tone or tint), but they are much thinner, have a cotton foundation, and are used to cover tables and to form a light waterproof wrapping for various purposes.



Linotype

Linotype, a machine used in printing for setting and casting lines of type. It is comprised

of a single machine, consisting of a keyboard for the operator, a magazine containing the moulds *matrices* as they are called—of the letters, and a pot of molten metal, with apparatus for casting. The keyboard is similar to that of a typewriter, the keys releasing the matrices, which drop from the magazine to their places in the line being set. When the line of matrices is complete, it is automatically spaced out and hot metal is injected, giving one solid line of type, called a *slug*. This machine is almost universally used in the printing of newspapers.

Linseed Oil is made from the seeds of the common flax, *Linum usitatissimum*. When pressed cold, an almost colourless oil of edible quality is obtained, with a yield of about 20 per cent. Hot-pressing gives a larger quantity of a yellowish-brown oil which has a peculiar taste and odour. The chief value of linseed oil depends on its conversion to a varnish-like solid when exposed to air, this property being most marked after the oil has been heated for some hours ('boiled oil'). Both the raw and boiled oil are largely used in the manufacture of paints, varnishes, printing ink, and linoleum. 'Carroll oil', a mixture of equal parts of raw linseed oil and lime-water, is a valuable remedy for burns.

Linum, the flax genus of plants, which gives its name to the nat. ord. *Linaceæ*. There are about eighty species, herbs or rarely small shrubs, chiefly found in the temperate and warmer extratropical regions of both hemispheres. Few are of any importance, except the flax plant (*L. usitatissimum*).

Linz (Lints), a town and river-port of Austria, on the Danube. It has a seventeenth-century cathedral, a new cathedral, and an old castle, and manufactures woollen, linen, silk, and cotton goods. Pop. (1920), 93,473.

Lion (*Felis leo*), a beast of prey of the cat genus, the most majestic of all carnivorous animals, distinguished by its tawny or yellow colour, a full flowing mane in the male, and a tufted tail with a sort of spine embedded in the end of it. The largest lions are from 8 to 9 feet in length. The period of gestation is five months; one brood is produced annually, with from two to four at a birth, and the mother nourishes the cubs for about a year. The mane of the male lion begins to grow when he is three years old; the adult age is reached about six or seven; and the extreme age is at about twenty-two, although some authorities differ from this estimate. The lion is a native of Africa and parts of Western and Central Asia. He preys chiefly in the night and on live animals, avoiding carrion, unless impelled by intense hunger. He approaches his prey with a stealthy pace, crouching when at a proper distance, when

he springs upon it with fearful velocity and force. The whole frame is extremely muscular, the foreparts being particularly so, giving with the large head, flashing eye, and copious mane a noble appearance to the animal, which has led to his being called the 'king of beasts', and to fancies of its noble and generous nature which have no real foundation. Of the African lion there are several varieties, as the Barbary lion, Gambian lion, Cape lion. The Asiatic varieties are generally smaller and may want the mane, as the maneless lion of Gujrat. The so-called American lion is the puma (*Felis concolor*).

Lions, Gulf of (Fr. *Golfe du Lion*), so called because of the roaring of its waves; an arm of the Mediterranean washing the southern littoral of France.

Lip'ari Islands (Rom. *Insule Eolie*), a volcanic group, comprising seven large islands in the Mediterranean, attached to the Sicilian province of Messina, producing figs, grapes, raisins, and sulphur. The main islands are Lipari, Stromboli, Panaria, Vulcano, Salina, Alicudi, and Filicudi. Lipari, Vulcano, and Stromboli still contain active volcanoes, and Stromboli was the scene of eruptions in 1902 and 1907. Pop. of the group, 22,000. Lipari, a town on that island, is the group capital and port, and contains a castle built by Charles V, with other relics mainly Grecian and Roman. Pop. about 15,700.

Lipetsk, a town of Central Russia, government of Tambov, on tl Voronej. It has sugar-factories, iron-foundries, and chalybeate springs. Pop. 22,000.

Lippe, formerly a sovereign principality of North Germany, proclaimed a republic, under the title of Freistaat Lippe, Nov., 1918. Area, 409 sq. miles. It lies on the Teutoburger Wald, and is traversed by the Werre, a tributary of the Weser. The principal towns are Detmold (capital; pop. about 14,500), Horn, Lemgo, and Blomberg. The status of principality of the Empire was granted in 1720. As a republic the Constitution is identical, but there is no prince. Pop. (1919), 154,818.

Lippi, Fra Filippo, Florentine painter, born 1412, died 1469. His most famous pictures are a *Coronation of the Virgin*, painted in 1441 for the nuns of San Ambrogio, now in the Florentine Academy; frescoes on the stories of St. Stephen and John the Baptist, in the Duomo of Prato; and a *Vision of St. Bernard*, in the National Gallery, London. The latter collection also includes an *Annunciation*. There are *Madonnas* in the galleries of Munich and Prato, the Pitti Palace, the Uffizi, and the Berlin Museum.—Cf. E. C. Strutt, *Fra Filippo Lippi*.

Lippi, Filippo, Italian painter, son of Filippo Lippi, born 1460, died 1504. Three of his pic-

tures are in the National Gallery, and the others are mainly at Florence.

Lippia, a genus of plants, nat. ord. Verbenaceae. *L. pseudo-thea*, a native of Brazil, is aromatic and fragrant, and when dried makes an agreeable tea. *L. citriodora* is the 'lemon-scented' verberna.

Lippstadt, a town of Westphalia, Prussia, on the Lippe, at one time a member of the Hanseatic League. Pop. 16,000.

Lipsius, Justus, properly *Jorst Lips*, a Flemish scholar, born in 1547, died 1606. He was educated at Brussels, and subsequently at Cologne and Louvain, where he was professor of ancient history. His works were numerous, and he rendered important services to the study of the Latin authors, especially Tacitus, Seneca, and Plautus. His *Opera Omnia* appeared at Antwerp in 1585.

Liquefaction of Gases. Although John Dalton suggested in a paper on *The Force of Steam or Vapour upon Water and various other Liquids* in 1801 that no doubt all gases would be reduced to liquids by the application of low temperatures and high pressures, no gas was liquefied until 1823, when Michael Faraday produced liquid chlorine by the 'mere pressure of its abundant vapour'. Sulphuretted hydrogen, carbonic acid gas, nitrous acid, cyanogen, ammonia, and hydrochloric acid were all liquefied by Faraday later in the same year. Large quantities of liquid carbon dioxide were made by Thilorier in 1835. In 1834, the gas in one vessel and force was pressed into another vessel. Solid carbon dioxide was obtained by suddenly reducing the liquid from pressure. Faraday endeavoured in 1844 to reduce oxygen, nitrogen, and carbon monoxide to the liquid state, using a bomb containing carbon dioxide and ether to obtain a low temperature and applying pressures of the order of fifty atmospheres. He did not succeed in this, but he added a number of others to the list of condensable gases, and produced solid ammonia, nitrous oxide, and sulphuretted hydrogen. Endeavours to liquefy oxygen by high pressure were made by M. P. Berthelot about this time. The pressure used was about eight hundred atmospheres, but no change of state was produced because there was no reduction of the temperature. The failure of other experimenters, notably Natterer, who used about three and a half times that pressure, was followed by the discovery by T. Andrews that every gas has a certain critical temperature above which condensation is impossible, whether the pressure be high or low. Raoul Pictet liquefied oxygen by the use of his system of cascade or closed cycle refrigeration. L. P. Cailletet also succeeded in producing liquid oxygen about the same time. Z. Wroblewski and K. S. Olszewski

worked together in Cracow, and from their early attempts deduced the critical temperatures, then, producing the required conditions, succeeded in liquefying nitrogen, and in 1885 Wroblewski produced liquid air for the first time. Sir James Dewar, a successor to Davy and Faraday at the Royal Institution, constructed a plant from which the liquids produced by the condensation of gases could be drawn off. He investigated the magnetic actions of liquid oxygen and ozone. Dewar invented the vacuum-jacketed vessel known as the thermos flask (see *Lagging*). The first use to which these vessels were put was as containers for liquefied gases. Hydrogen was made liquid by Sir James Dewar for the first time in 1898, and was solidified by him in the following year.

A few years before hydrogen was liquefied, a substance helium, known to exist in the sun by the spectroscopic researches of Sir Edward Frankland and Sir Norman Lockyer, was shown to exist on the earth by Sir William Ramsay. This substance was found to be a much less condensable gas than hydrogen. Dewar's preliminary experimental work showed that the boiling-point would be of the order of 5° C. absolute. Dr. H. Kamerlingh Onnes succeeded in liquefying helium in July, 1908. Its boiling-point has been determined as about 4° C., its critical temperature as 0° C. absolute. The attainment of these exceedingly low temperatures shows a very close approach to the absolute zero.

Liquefied gases have proved of great value in research work and in some industries. The use of these liquids in creating high vacua, in separating mixed gases by fractional distillation, and in calorimetry is well established. In industry the uses of liquid gases are very limited. The temperatures they give as refrigerators are much lower than those required industrially, which can be cheaply obtained by using more condensable gases. Liquid gases are too costly and inconvenient to be of any use as sources of motive power. The great use of liquid air is the production of oxygen from the atmosphere by fractional distillation. The nitrogen (q.v.) liberated is made to combine with calcium carbide to produce calcium cyanamide, which is used as a fertilizer. The nitrogen may also be used as the basis for the synthetic production of ammonia and of nitric acid. This latter industrial use was developed as a national monopoly to an enormous extent in Germany during the European War. One plant alone had a capacity of 100 tons of liquid air per day, which nearly equals the total production in the British Isles.

Liqueurs (li-keurs'), highly aromatic and generally oily and more or less viscous alcoholic beverages composed of water, alcohol, sugar,

and some aromatic infusion extracted from fruits or seeds. Among the best-known liqueurs are: Chartreuse, Kûmmel, Maraschino, Curaçoa, Bénédictine, Cointreau, Avocant, and Crème de Menthe. The great difference in the qualities of different liqueurs is principally due to a variation in the proportions of the main ingredients, cane-sugar or syrup made therefrom and alcohol. The French distinguish three qualities—the ratafias or simple liqueurs, the oily or fine liqueurs, and the creams or superfine liqueurs.

Liquid, one of the three phases of matter. See *Fluid*; *Hydrostatics*; *Hydrodynamics*; *Liquefaction of Gases*.

Liquidambar, or **Liquidamber**, a genus of trees of the nat. ord. Hamamelidaceæ. They are handsome trees, with lobed shining leaves, and catkins or globular heads of monoecious flowers. The fragrant liquid resin called oil of liquidamber and copal balsam is obtained from the *Liquidambar styraciflua*, found in Mexico and the United States. *L. orientalis* (Oriental liquidambar tree) yields common storax, which is used as a stimulant expectorant.

Liquidator, a person appointed to conduct the winding-up of the affairs of a firm or company. His duty is to realize the assets, to discharge the liabilities to the extent to which the assets permit, and to divide any balance among the parties in right thereof. For these purposes he may bring and defend actions and suits, and do all necessary acts in name and on behalf of the firm or company.



Liquorice (*Glycyrrhiza glabra*)

A, Flower. B, Root. C, Seed. D, Pod.

Liquorice, a name for herbs of the genus *Glycyrrhiza*, belonging to the nat. ord. Legu-

minosæ, and growing in Southern Europe, Asia, and Africa. *G. glabra* is a perennial plant with herbaceous stalks and bluish papilionaceous flowers. The well-known liquorice juice, used as a demulcent and expectorant, is extracted from the root as well as from that of others. *Indian liquorice* is *Abrus precatorius*. See *Abrus*.

Lira (plural *lire*; from the Lat. *libra*, pound), Italian standard silver coin, existing in 1, 2, and 5 *lire* pieces. Gold coins of 5, 10, 20, 50, and 100 *lire* were in circulation before the European War.—The *lira* is also a Turkish gold coin or Turkish pound, equivalent to 18s. English, approximately, at normal rates of exchange. See *Italy*.

Lirima, a Peruvian volcanic peak in the Tarapacá regions, perpetually snow-capped, and rising to an altitude of about 19,200 feet.

Liriodendron, a genus of North American trees belonging to the nat. ord. Magnoliaceæ, and containing only one species, the tulip tree (*L. tulipifera*). See *Tulip Tree*.

Lisbon, capital and seaport city of the Republic of Portugal, on the Tagus, is famous for its scenic aspect, and for the catastrophe of 1755, when some 40,000 people were buried under the ruins caused by an earthquake. The new city was rebuilt in large airy streets, and possesses one of the best harbours on the Atlantic. It is a fishing centre, and has few important manufactures or industries. A fine aqueduct carries the city water-supply from springs 10½ miles distant. The scientific and literary institutions comprise the university (founded 1858), military academy, polytechnic school, and National Library. In addition there are eight theatres and the inevitable bull-ring. A Court of Appeal (Tribunas de Relação) and the Supreme Court have seat at Lisbon, which is also an archiepiscopal see. In 1883 the city annexed the adjacent municipalities of Belem, Alcântara, Pedrouços, and Junqueira. Vasco da Gama, Catherine of Braganza, and the poet Camoens are buried among kings and princes in the Grand Belem Cloister, which is now an orphanage.

Lisbon is a place of remote antiquity, its earliest name being *Olisipo*, but *Felicitas Julia* was the Roman title. It was captured by the Moors in A.D. 716 and remained in their possession till 1147. The Visigoths changed the name of the town to *Olisipona*, and the Moors to *Lishbuna*, the present Portuguese name being *Lisboa*. The Portuguese drove out the Moors in 1147, and Lisbon was made the capital city in 1260, rapidly attaining a position as the richest city of Europe, mainly through the discoveries of Vasco da Gama, Pizarro, Orellana (the discoverer of the Amazon), and through the conquest of India. During the Peninsular War the seat of government was

removed to Rio de Janeiro, and Lisbon rapidly degenerated to a residential position among European cities, hastened also by the secession of Brazil. Pop. (1911), 435,350.—*Lisbon*, a district of the province of Estremadura, Portugal. Area, 3065 sq. miles; pop. (1911), 853,415.— Cf. G. Young, *Portugal Old and Young*; A. F. G. Bell, *Portugal of the Portuguese*.

Lisburn, a town of County Antrim, Ireland. Christ Church, Lisburn, was constituted a cathedral (1662) for the united dioceses of Down, Connor, and Dromore, Jeremy Taylor being bishop of the see until his death in 1667. In 1827 a mural monument was erected to him in the cathedral. Linen manufacturing was introduced in 1685 by Huguenot refugees, and is still the predominant industry. Pop. 12,400.

Lisleux, a town of Calvados, France, on the Touques. The church of St. Pierre (1045-1231) was a cathedral when Lisleux was a bishopric, and in it Henry II of England was married to Eleanor of Aquitaine. It has a beautiful lady-chapel, erected by Bishop Pierre Cauchon to expiate his share in the martyrdom of Joan of Arc. The bishopric was withdrawn in 1802. Lisleux was the *Noviomagus Lexoviorum* of the Romans. Pop. 16,000.

Lismore, a cathedral town of County Waterford, Ireland, on the Blackwater, where a bishopric and monastery were founded in the seventh century by St. Carthagh, after whom the present cathedral is named. The castle, founded by Prince John (1185), was a seat of the Duke of Devonshire.

Lismore, an Ely. of Argyllshire, Scotland, at the entrance of Loch Linnhe; area, 15 sq. miles. Lismore was the residence of the Bishop of Argyll and the Isles, and the choir of the thirteenth-century cathedral is now the parish church. Among other relics are the ruins of two Scandinavian forts. Pop. (1921), 357.

Lissa, an island on the Dalmatian coast of the Adriatic, formerly Austrian, now in Yugo-Slavia. From 1810 to 1815 it was garrisoned by the British, who fortified it. *Lissa* is the chief town, with a fortified harbour. Wine and sardines are exported. Lissa was the scene of the first naval action between squadrons of ironclads (1866), in which the Austrians sank two Italian ships; the British also defeated a French fleet here in 1811, town monuments commemorating both victories. Pop. (island), 10,000; (town), about 4000.

Lissa, a town of Posen, Poland, a commercial and industrial centre. It was burned by the Poles in 1650 and by the Russians in 1707. Pop. 17,156.

Lister, Joseph, Baron, surgeon and scientist, born at Upton, Essex, 1827, died 1912, the title becoming extinct. He graduated at London, 1852, and was professor of surgery at Glasgow from

1860 to 1869, when he became, until 1877, professor of clinical surgery at Edinburgh. In 1877 he transferred to the corresponding chair in King's College, London, and retired in 1893. His name is perpetuated in the bacteriological experiments by which he was enabled to introduce antiseptics, an innovation which revolutionized surgery and ensured the cleanly performance of operations hitherto attended invariably by death from septic poisoning. Pasteur's discovery and formulation of the theory regarding fermentation and putrefaction (1862) exerted considerable influence upon Lister's experiments, and he almost immediately introduced and successfully used carbolic acid as a germicide. He was made a baronet in 1883, created baron in 1897, and was president of the Royal Society (1895-1900), and president of the British Association (1890). He contributed extensively to medical and other journals, and was one of the original recipients of the O.M. (1902).—BIBLIOGRAPHY: Sir R. J. Godlee, *Lord Lister*; and *Sir Papers by Lord Lister* (with a biography; 1921).

Liszt, Franz, Hungarian pianist and composer, born 1811, died 1886. He made his debut at nine years of age, studied at Vienna and Paris, produced an opera (1825), and became director of the Court Theatre, Weimar, in 1849. He originated the piano recital. In 1861 he took orders at Rome, and was director (1870) of the Conservatoire at Budapest. Liszt's daughter married Richard Wagner, who was considerably helped in his artistic career by the relationship.—Cf. J. Huneker, *Franz Liszt*.

Lit'any (from the Gr. *litania*, supplication), a term generally applied to a series of short prayers or supplications together forming one whole. The earliest mention of the word in connection with Christian services seems to be by Basil in the fourth century, but it was not until the fifth century that litanies came specifically into use. Litanies became afterwards very common, and every saint of the Roman calendar had his litany. The best-known litany at the present day is that of the Anglican Church. The form now in use was drawn up by Cramer in 1544. It was constructed with great care, and the chief portion was taken from the *Sarum Rogation-tide* litany. A considerable portion was also taken from the *Consuetudo* of Archbishop Hermann of Cologne. It is chanted in the morning service, the priest uttering one prayer, and the people responding with another alternately.—Cf. F. E. Brightman, *Liturgies, Eastern and Western*.

Litchi, or Lee-Chee (*Nephelium Litchi*), the fruit of a tree belonging to the nat. ord. Sapindaceae, a native of the south of China. The tree is of a moderate size, with brown bark, the

leaves large, and the fruit is produced in bunches, which are pendant from the extremities of the twigs. The litchi is a red or green berry, about $1\frac{1}{2}$ or 2 inches in diameter, with a tough, thin, leathery coat, and a colourless half-transparent pulp, in the centre of which is a single brown seed. The pulp is slightly sweet, and pleasant to the taste.

Lit de Justice (*lê de zhûs-tês*; literally 'bed of justice'), formerly a solemn proceeding in France, in which the king, with the princes of the blood royal, the peers, and officers of the Crown, State, and court, proceeded to the Parliament, and there, sitting upon the throne (which in the old French language was called *lit*), caused those commands and orders of which the Parliament did not approve to be registered in his presence. Louis XV held such a *lit de justice* in 1763, to introduce certain imposts, but Parliament resisted, and he was obliged to yield. The last *lits de justice* were held by Louis XVI in 1787 and 1788.

Literature. By literature, in its widest sense, we understand the body of writings produced by all nations and at all periods; all the written documents wherein the human mind has expressed its knowledge, thoughts, and feelings through the medium of language. In a narrower sense, however, the term literature is applied only to such writings which are distinguished by their beauty of form and by the emotional effect which they produce. Such works have the power not only to arouse our interest, but also to stir our emotions.

The question, what is literature and what is not, is a very vexed one. Some literary historians would apply the term literature to every written document, whilst others give the term a much narrower meaning. Matthew Arnold wrote that "all knowledge derived from books is literature", and he also defined literature as "a criticism of life". If by criticism he meant interpretation, then this is the happiest and most concise definition one could wish for. Literature may indeed be rightly defined as "an interpretation of life and nature under various forms of literary art", an interpretation which enables the reader to understand and to appreciate the meaning and beauty of life and of nature.

Literature is the expression, in words, of the human spirit, of its investigations, longings, and aspirations. It is, to some extent, thought about life, but a thought that comes both from the head and from the heart. Deeply rooted in the human breast is the desire of man to express what he feels in line, colour, or sound, in sculpture, painting, music, and poetry. And just like all other forms of art, literature is the record of impressions made upon the mind of the artist.

The author speaks both to our intellect and to our imagination. He puts clearly and vividly before us what is invisible; he interprets for us what we did not understand. Literature concerns itself with life and human activity. But it is not only an interpretation of life, it is also a storehouse of human knowledge. It acquaints us with the life of past generations; it reflects the intellectual, moral, and social state of humanity in ages bygone; it gives us an adequate idea of the degree of civilization and culture of a nation at some remote period in history. Social forces and political events are both cause and effect of a nation's literature. A history of universal literature is, therefore, not only a history of books, but also a history of the ideas and ideals of humanity. For the subdivisions of literature see the articles: *Drama*; *Novel*; *Poetry*; *Prose*, &c. - **BIBLIOGRAPHY:** C. M. Gayley and F. N. Scott, *An Introduction to the Methods and Materials of Literary Criticism*; E. H. Lewis, *An Introduction to the Study of Literature*; W. H. Hudson, *An Introduction to the Study of Literature*; Ch. Letourneau, *L'Évolution littéraire dans les diverses Races humaines*.

Litharge, the yellow or reddish monoxide of lead (PbO). It is prepared by exposing molten lead to the atmosphere at any temperature below $877^{\circ} C$, the melting-point of the oxide. As the litharge slug is formed it is skimmed off the top, exposing a clean surface to similar action. It is extensively used in paint manufacture, as the raw material in the making of red lead, in glass-making and -finishing, and also as a flux in metallurgical laboratories. See *Lead*.

Lithia, Li_2O , the oxide of the element lithium. It is obtained chiefly from the minerals *lepidolite*, a compound of alumina silicate with lithium potassium fluoride, a *petalite*, a complex sodium aluminium lithium silicate. The oxide is white and is slowly dissolved by water, giving an alkaline solution. The 'lithia' of medicine is a mixture of lithium carbonate and citric acid.

Lithium, an alkaline metallic element; atomic weight, 6.94. The silver-white metal is obtained by electrolysis of the fused chloride. Its specific gravity is about 0.6, which is less than that of any other solid or any liquid. See *Lithia*.

Lithography, the art of drawing upon and printing from stone. The facility with which this is accomplished arises from the antagonistic qualities of grease and water. The processes of the art depend on the adhesion to a grained or polished stone of a certain greasy composition which forms the lines of the drawing, &c.; on the power acquired by those parts penetrated by the greasy composition of attracting and becoming covered with a specially prepared ink; on the interposition of water, which prevents the ink adhering to the parts not impregnated

with the grease; and on pressure, which transfers to paper the greasy tracings or drawings. It is the invention of Alois Senefelder, a native of Prague (1771-1834). The materials, instruments, and methods of this art are as follows:

The *lithographic stones*, first used by Senefelder, have proved to be the most suitable for the purpose of lithography. This stone, which is found in the district of Kelheim, Bavaria, is a species of slaty limestone; its colour in the best quality is pale-yellowish drab, and for printing purposes its thickness must be from 2 to 4 inches. In preparing stones for the printer they are squared, levelled, ground, and polished.

Lithographic ink is made of wax, white soap, tallow, shellac, mastic, and lamp-black. What are called *chalks* are made from much the same materials, these ingredients being subjected to heat until they are fused, poured out on a slab to cool, and then cut into the required sizes.

There are various styles in which drawings on the stone are executed. *Draving on the smooth stone* is executed with steel pens and sable-hair brushes. The design, &c., is drawn on the stone in reverse, after which it is slightly etched with dilute acid. In *chalk draving* the surface of the stone is roughed or grained, after which the drawing is traced upon the stone. The tinting or shading follows. When completed the drawing is etched, after which it is put into the hands of the printer for printing. The method of drawing directly on the stone has been largely superseded by the use of prepared stones, both grained and smooth, on which the drawing is executed, and afterwards transferred to the stone. *Tinting and chromo-lithography* is much practised in the reproduction of works of an artistic character.

The machines of to-day are mostly direct rotary and rotary off-set. The speed of the machines ranges from 1600 to 3000 impressions per hour. The number of good impressions taken from drawings or transfers on these machines can be anything from 20,000 to 50,000. The drawing or writing can also be preserved good on the stone for any length of time by rolling it with black ink and covering with resin and gum. For similar purposes zinc and aluminium are treated in much the same manner as stone. See *Zincography; Printing; Process-work*.

Lithospermum. See *Gromwell*.

Lithotomy, in surgery, the technical name for the operation popularly called cutting for the stone. The method formerly adopted of cutting through the perineum in front and to the left of the anus, so as to reach and divide the urethra and neck of the bladder where it is surrounded by the prostate gland, has now been totally abandoned. The treatment of stone in the bladder by crushing (see *Lithotripsy*) has made

the necessity for lithotomy very much rarer than used to be the case. When lithotomy has to be performed, it may be done through the front wall of the abdomen (the suprapubic operation), or by cutting in the middle line of the perineum.

Lithot'riety, in surgery, the operation of crushing a stone in the bladder into fragments of such a size that they may be expelled by the urethra. The instrument by which the stone is broken up is introduced in the same manner as a catheter or sound into the bladder, and after catching the stone either crushes, bores, or hammers it to pieces. The instrument, which is called a lithotrite, has two movable blades at the extremity, which are brought together to crush the stone by means of a powerful screw.

Lithuania, a democratic republic of the Baltic, formed from parts of pre-revolutionary Russia, and comprising approximately the districts of Kovno, Vilna, and Suwalki. It has an outlet to the Baltic on 56° N. lat., with the roadstead of Polunga, and has a railway system continuous with those of Latvia, East Prussia, Poland, contiguous states, and Russia. The Niemnan (Neman) traverses the flat, low country in the south; lakes and marshes abound; 21 per cent of the land area is afforested. Vilnius or Vilna (pop. about 214,000) is the capital; Kaunas or Kovno (pop. 90,000), Gardinas or Grodno (pop. 62,000), and Suwalki or Suwalki (pop. 31,000) are other large towns. 70 per cent of the inhabitants are Lithuanians, and their language is the most archaic of the living Indo-European speeches. Agriculture and its allied pursuits are the staple industries, rye (10,000,000 cwt. in 1920), wheat, barley, oats, and potatoes being produced. Poultry-farming and apiculture are progressive. Corn, cattle, hams, eggs, butter, timber, hides, and wool are exported; fertilizers and machinery are the main imports. Manufactures are undeveloped. Area, about 59,638 sq. miles; pop. 4,500,000 (estimated).

In early times Lithuania was a grand-duchy. Yagello of Lithuania became king of Poland (1386) by his marriage with Yadwiga (Hedwig), queen of that country, and under Vytautas the Great (1392-1450), his successor, Lithuania was aggrandized and extended from the Black Sea to the Baltic. United with Poland (1569), both countries elected a joint king and had a common Parliament. In the partitions of Poland, Greater Lithuania fell to Russia (1776), and Prussia annexed Lithuania Minor. During the European War Lithuania was occupied by the Germans (1915), and subjected to a rigorous Germanization until a conference at Vilna elected a State Council and the independence of Lithuania was proclaimed (16th Feb., 1918). The state is now governed by a President, who appoints a Minister-President, and he, in turn, forms a Cabinet.

The Constituent Assembly (112 representatives) elects the President. Representatives are elected by universal, equal, direct, and secret suffrage on the proportional system.—BIBLIOGRAPHY: A. S. Rappoport, *A History of Poland*; W. H. Vidunas, *Litauen*; A. Kun Jusaitis, *History of the Lithuanian Nation*.

Litmus, or **Lacmus**, a purple colouring-matter obtained from *Rocella tinctoria* and other lichens. The substance is used as an indicator (q.v.) for the presence of acid or alkali in solution. Paper tinged with a dilute solution of the substance, or a drop of the substance placed in solution to be tested, is immediately turned blue if alkali be present, and bright red if acid be present. Even feeble acids have the power of changing the colour of litmus solution.

Little Falls, a town, New York, United States, on the Mohawk River and the Erie Canal. The mills and factories are operated by water-power derived from falls in the Mohawk River. Pop. (1920), 13,029.

Little Rock, a city and capital of Arkansas, United States. It stands on a rocky bluff, rising about 50 feet above the river, and has several important educational institutions. Pop. (1920), 65,039.

Littleton, Thomas, born at the beginning of the fifteenth century, died 1481. He was a judge of common pleas under Edward IV. and his work on *Tenures*, written originally in Norman-French, with the commentary of Sir Edward Coke, was at one time the principal authority on the property laws of England.

Littoral, a geographical term employed to indicate a coastal belt or region. In zoogeography it is applied to the area of greatest abundance in marine organisms of a coastal type, as opposed to the pelagic or deep-sea area. Littoral deposits are formed round the littoral margin by river deposits or by coastal erosion.

Littre, Maximilien-Paul-Émile, French philologist, born 1801, died 1881. He studied medicine, but devoted himself to philosophy and philology, adopted the positive philosophy of A. Comte, and published philosophical works in addition to treatises concerned with medicine, including a translation of Hippocrates. In 1862 he published his *Histoire de la Langue française*. His chief work, a dictionary of the French language (*Dictionnaire de la Langue française*), was completed in 1877. Its success was prompt and complete. In 1871 he was elected to the National Assembly, in 1875 was named Senator for life, and next year was admitted a member of the French Academy. Among his works are *Médecine et Médecins* and *Littérature et Histoire*.

Liturgy (Gr. *liturgia*, 'public service'), a special series of prayers, hymns, pieces of Scripture, or other devotional matter, arranged and

prescribed for use in worship; or in a narrower sense a prescribed service for the celebration of the eucharist; hence in the Roman Catholic Church equivalent to the Mass or service contained in the *Missal*. A number of ancient liturgies are connected with places or names of persons, but until the fifth century there seems to have been no written liturgy. The chief liturgical books in the Roman Catholic Church are the *Missal* and the *Breviary* (q.v.), both in Latin. In 1523 Luther drew up a liturgy, or form of prayer and administration of the sacraments, which in many points differed but little from the Mass of the Church of Rome. He did not, however, confine his followers to this form, and every country in which Lutheranism prevails has its own liturgy. Calvin prepared no liturgy; but his followers in Geneva, Holland, France, and other places drew up forms of prayer, of which the Genevese and the French are the most important. In England before the Reformation the public service of the Church was performed in Latin, and different liturgies were used in various districts. The most celebrated of these were the *Breviary* and *Missal secundum usum Sarum* (that is, as used at Salisbury), compiled by the Bishop of Salisbury about 1080. The English *Book of Common Prayer* dates from the reign of Edward VI. (See *Common Prayer*.) It was based on the Roman *Breviary*. In the portions of Scripture contained in the *Prayer Book* the authorized version was afterwards adopted, except in the *Psalms*, which are according to *Coverdale's Bible*. This last revision (that of 1662, the result of the so-called Savoy Conference) introduced some rather important alterations and additions, and brought the *Prayer Book* practically to its present shape, though certain changes in the lessons, &c., received parliamentary sanction in 1871 and 1872. The *Book of Common Prayer* (with certain alterations made after disestablishment) is used by the Irish Church, and also by the Episcopal Church in Scotland (but a special communion office is used in some of the Scots churches). The Established Church of Scotland (Presbyterian) has no liturgy, the *Directory for the Public Worship of God* comprising only certain general rules for the conduct of public worship. The *Book of Common Prayer* of the Protestant Episcopal Church in the United States was adopted in 1789 with some minor deviations from the English.—BIBLIOGRAPHY: J. M. Neale, *Essays on Liturgiology and Church History*; William Maskell, *Ancient Liturgy of the Church of England*; F. E. Brightman, *Liturgies, Eastern and Western*; P. Duchèsne, *Origines du Culte chrétien*.

Liutprand, or **Luitprand**, historian and prelate, born about A.D. 920, died about 972. From page of King Hugo of Italy he rose to be Chan-

cellor under Berengarius, and was appointed Bishop of Cremona by Otho of Germany. Employed as an Ambassador on several important missions, he had an excellent opportunity of studying the events of the period. Besides an interesting narrative of a mission to Constantinople, he has left us a *History of Otho*, and his *Antapodosis*, a history of Europe in six books, from 886 to 950. These works are the chief historical authority for that period.

Liver, the largest gland in the human body, weighing from 50 to 60 oz. avoirdupois. This gland is not confined to the Vertebrate animals, all of which—save the Amphioxus or lancelet—possess a well-developed liver, but is found in many Invertebrata. In man the liver is part of the alimentary apparatus, and is situated just below the diaphragm on the right side, extending across the middle line of the body towards the left side. Its front border reaches just below the border of the chest when the posture is sitting or standing; but when the person lies down the liver passes slightly up so as to be completely under cover of the ribs, except a small portion which extends beyond the lower end of the breast-bone. From its position it is extremely liable to compression and injury. In its general form the liver is flat, broad, and thick towards the right side, becoming narrow and thin towards the left side. Its upper surface is convex or arched and fits into the concave surface of the diaphragm, whilst its lower surface is irregularly divided into certain 'lobes', five in number, and separated by clefts or fissures. These lobes are known as the right, left, spigelian, caudate, and quadrate lobes.

When microscopically examined, the entire mass of the liver is found to consist mainly of large many-sided cells containing granular protoplasm. They are arranged in groups or masses, each little mass being called a lobule, and each lobule slightly mapped off by connective tissue and containing a meshwork of blood-vessels and ducts. These blood-vessels are branches of the *portal vein*. This vein receives the blood which has circulated in the stomach and intestines, and carries it throughout the entire liver by a network of finely subdivided veins. It is from this supply of blood that the bile is secreted. The blood passes off from the liver by the *hepatic vein*, formed by the union of small vessels which begin in the centre of the lobules. The connective tissue of the liver is supplied with arterial blood by the *hepatic artery*. This blood, like that which has entered through the portal vein, is drained off into the hepatic vein. There is, however, another set of vessels which ramify through the liver, namely the *bile ducts*, whose business it is to carry off the bile produced in the gland. These ducts intersect and unite until

in the end two channels are formed, one from the right and the other from the left of the liver, which ultimately form one common exit into the small intestine called the *common bile duct*. Thus, when the bile has been secreted by the liver-cells, it is transferred by way of this hepatic duct into the small intestine, where it mingles with the food. When this flow of bile ceases, as it does when intestinal digestion is interrupted, the supply which still continues is stored in the gall-bladder, which forms a kind of reservoir situated under the liver.

The functions of the liver would seem to be at least threefold. It serves (1) to store up in the form of glycogen certain constituents of the food brought from the stomach and intestines by the portal vein, and to transform this glycogen into sugar (glucose), which is distributed to the body as it is needed; (2) to destroy the worn-out blood corpuscles, retaining the iron but eliminating the iron-free colouring-matter as part of the bile; and (3) to excrete the bile which is poured into the intestine. See *Bile*; *Gall-bladder*.

The liver is subject to a variety of diseased conditions, such as cancer, often as secondary to a growth of the alimentary canal, and abscess, usually following tropical forms of dysentery. There is also *congestion of the liver*, which indicates that the structure is overcharged and choked with blood. This arises from various causes: heart-disease, disease of the lungs, or even excess in food or drink will produce congestion. The symptoms are excessive weight, fullness, and a tenderness in the organ. *Cirrhosis of the liver*, or *drunkard's liver*, is frequently caused by excessive spirit-drinking, but not necessarily so, as it has been known to occur in children. The symptoms are many and not easily recognized; and the disease may remain for years before a fatal issue. *Fatty degeneration of the liver* occurs when the cells become crowded with globules of oil, and it becomes large and pale. This result usually arises from overfeeding or drinking and want of exercise. See *Jaunder*.

Liver-fluke. See *Ditomum*.

Liverpool, Robert Banks Jenkinson, second Earl of, born 1770, died 1828. He entered Parliament in 1790. As Foreign Secretary in the Addington ministry he negotiated the Treaty of Amiens, and he became Home Secretary in 1804. On the assassination of Perceval in 1812 he became Premier, and held that position till 1827. His opposition to all liberal measures, the severity with which he repressed internal disturbances, and his prosecution of Queen Caroline rendered him extremely unpopular.

Liverpool, an episcopal city, parliamentary and county borough of Lancashire, England. The district was first settled by the Norsemen in the eighth century, but Liverpool was only

founded in actuality after the partial conquest of Ireland (q.v.) by Strongbow, when the Mersey was used as a harbour to facilitate communications with that country. Its commercial progress dates from the Restoration.

Liverpool is situated on the Mersey, 3 miles from its mouth, and is the third city and principal seaport of Great Britain. It is served by seven railway systems, by two inland water-ways, and an electric overhead railway. Civic tramways maintain communications internally. Industrially, Liverpool is not a great city, but has some manufactures, e.g. shipbuilding and its subsidiaries, and important oil- and cake-mills. Transport and problems connected therewith monopolise commercial Liverpool. The docks have a quayage of 30 miles, and a total water area of 500 acres (including Birkenhead). The net tonnage of vessels which cleared from the port in 1918 was 13,071,000. The main imports are raw cotton, wheat, live-stock, wool, tobacco, and food-stuffs; and the exports, iron and steel goods, textiles, soft goods (from Manchester), and machinery.

The town hall, opened 1745, is occupied by the Lord Mayor as the municipal mansion house. The university was, until 1903, when it received a charter of incorporation, a constituent college of Victoria University. A Protestant cathedral, designed by Sir G. G. Scott, is now being erected, the foundation-stone having been laid by King Edward VII (1904). In 1910 the lady-chapel was completed, and one-third of the building will be ready in 1923. Pop. (1921), 803,118.

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Liverpool Range, a spur of the great coastal mountain system of Australia, separated from the Blue Mountains by the Goulburn River (Cassilis Gap).

Liverworts (so named from the appearance of the plants), a subdivision (Hepaticæ) of Bryophyta (q.v.), differing somewhat from mosses, to which, however, they are closely allied.

Livery Companies, the civic companies or city corporations of London, survivals of the ancient 'guild' system (see *Guild*). In London the influence of the 'craft guilds', as opposed to that of the 'merchant guilds', was predominant; they very early rose to great importance, and by the close of the fourteenth century had practically controlled the municipal government of the metropolis. Their members were called 'liverymen' because they were entitled to wear the uniform, or livery, of their respective companies. In the early records of the Mercers' Company regulations are laid down for an annual dinner, contributions of members and apprentices, election of masters, settlement of disputes between members, and relief of impoverished

members. Early in the fifteenth century this company provided standard brass measures, and generally regulated the trade. At the present time there are seventy-six livery companies in London, including the twelve great companies of Clothworkers, Drapers, Fishmongers, Goldsmiths, Grocers, Haberdashers, Ironmongers, Mercers, Merchant Taylors, Salters, Skinners, and Vintners. The government of London gradually passed from their exclusive control, and by the time of the Tudors they had lost the supervision of their own trades. They are now little more than charitable societies. The Merchant Taylors, Haberdashers, Grocers, and Mercers have identified themselves with large public schools. The Reform Bill of 1832 deprived the liverymen of their exclusive privilege of voting for members of Parliament for the City. In 1884 a Royal Commission was appointed to inquire into the régime of the companies, and estimated their trust and corporate income at over £750,000, and the capital value of their property at £15,000,000. - Cf. Thornley and Hastings, *Guilds of the City of London and their Liverymen*.

Livingstone, David, missionary and African explorer, born at Blantyre, Lanarkshire, 1813, died at Iala 1st May, 1873. His parents had settled in the neighbourhood of the cotton-mills near Blantyre, where David became a 'piecer' at the age of ten. While at work in the mill he learned Latin and read extensively, and having attended the medical and Greek classes at Glasgow University, he finally became a licentiate of the Faculty of Physicians and Surgeons of Glasgow. Under the auspices of the London Missionary Society he proceeded in 1840 to South Africa, where he joined Robert Moffat in the missionary field. His first station was in the Bechuana territory, and here for nine years he was associated with Moffat, whose daughter he married. Having heard from the natives that there was a large lake north of the Kalahari Desert, he proceeded to explore that region, and discovered the valley of the Zouga and Lake Ngami. Subsequently he penetrated farther north-west until he reached Linyanti, the capital of the Makololo territory, situated on the Chobe, a tributary of the Zambesi, which river he also visited. Between 1853 and 1856 he made a great series of journeys. Starting from Linyanti, he ascended the Locunbye (Upper Zambesi), journeyed overland to Lake Dilolo, and thence to St. Paul de Loanda on the west coast. Returning to Linyanti, he struck eastwards from there in 1855, tracing the Zambesi to the Indian Ocean, and reaching Quilimane on the east coast in 1856, having thus crossed the entire continent. The record of this journey is found in his *Missionary Travels and Researches in South Africa* (London, 1857). After making various journeys and ex-

ploring the Lake Nyassa and Zambesi region, Livingstone set forth in 1865 to explore the doubtful sources of the Nile. From this time till his death he was engaged in laborious explorations in the lake region of South Africa, especially to the westward of Nyassa and Tanganyika, where he discovered Lakes Bangweolo and Moero, the Upper Congo, &c. For about three years he was lost to view, and doubts regarding his safety were only set at rest when it was known that H. M. Stanley, the special correspondent of the *New York Herald*, had found Livingstone at Ujiji, on Lake Tanganyika. They parted in March, 1872, Livingstone marching to explore the southern end of Tanganyika, and Stanley proceeding to Zanzibar. After another year's wanderings he died at Chitambo's Village (Ilala). His body was buried in Westminster Abbey, having been conveyed to the coast by his faithful followers.—BIBLIOGRAPHY: T. B. MacLachlan, *David Livingstone* (Famous Scots Series); Sir H. H. Johnston, *Livingstone and the Exploration of Central Africa*; T. Hughes, *David Livingstone* (Men of Action Series); A. Z. Fruzer, *Livingstone and Newstead*.

Livingstonia, a mission of the United Free Church of Scotland, established in 1875, at the south end of Lake Nyassa, South Africa; headquarters now on west side of lake (Bandawé).

Livius Andronicus, Roman poet, lived at Rome in the beginning of the third century B.C. He introduced tragedies after the Grecian model to the Roman stage, and, besides several epic poems, wrote a translation of the *Odyssey* in the old Saturnine verse. Only a few fragments of his writings are extant.

Livonia. See *Latvia*.

• **Livre** (lê-vr), an old French coin superseded since 1795 by the franc. The *livre tournois* was worth 20 sous, about 10d. sterling, 80 of them being equivalent to 81 francs; the *livre paris*, 25 sous, about 1s. Livre was also the ancient unit of weight, the earliest being the *livre esterlin* of Charlemagne, amounting to 367.128 grammes. It was supposed to be based on an Arab standard, a *yusdruma*, sent to Charlemagne by the Caliph Al Mamun.

Livy (Titus Livius), Roman historian, was born at Padua in 59 B.C., and died there in A.D. 17. Of the facts of his life not much is known. He appears to have belonged to a good family, and to have been comfortably off. He spent most of his life at Rome in the composition of his history. In politics he was a moderate Conservative; but his mild republicanism did not prevent him from enjoying the friendship of Augustus. He led a quiet life of study; in the preface to one of his later books he says that writing has become with him a fixed habit, which he could not shake off without discomfort.

After the accession of Tiberius he returned to Padua, where he died three years later.

Livy wrote some minor works, which have not been preserved. His life's work, however, was his history of Rome, from its foundation to the death of Drusus (9 B.C.), or, to give it its proper title, *Ab urbe condita libri*. This immense work consisted originally of one hundred and forty-two books; of these only thirty-five are now extant (i-x and xxi-xlv), two of the extant books being incomplete (xli and xliii). It is a work of the greatest genius, and well merits the foremost place among Roman histories which it has won. In order to be able to appreciate the merits of the work, it is necessary to understand the intention of the author in writing it. Livy wrote his history as an imperishable monument to the greatness of Rome. It may be considered as a kind of sermon taking for its text the magnificent line of Ennius:

Moribus antiquis res stat Romana virisque.

He is the most human of historians. With elaborate investigations and detailed research he had nothing to do. He did not set out to write history in that way. He seems not only never to have undertaken any journeys for the purpose of research, but to have been unwilling to investigate sources of information which were conveniently at hand in Rome. Elaborate research was not considered part of the duty of an historian. Livy simply took a number of old authorities who had written more or less dull books of annals, and wrote them up into his own marvellous narrative. His accuracy, therefore, varies with that of his source. He follows his sources in a totally uncritical fashion, and thus is sometimes led into inconsistencies and contradictory statements. He lived a life somewhat apart from the world, and so is not always successful in dealing with military matters and with politics. He is at his best when dealing with men, especially with Romans of the old school, such as Quintus Fabius Maximus. He is somewhat inclined to glorify Rome at the expense of her enemies, but his portrait of Hannibal is wonderfully impartial. His style, however, is what has made him outstandingly great. It can be argued that there is no greater prose style in the world than that of Livy. In this as in several other respects he resembles Gibbon. There are few better examples of the value of style than Livy. Polybius, painstaking, meticulous, and impartial, is only read by specialists; Livy, careless, inaccurate, and prejudiced, is widely read and admired. R. L. Stevenson had to discontinue reading Livy as he found him exercising an undue influence upon his style. Pliny the Younger (*Epistles*, ii, 3) tells of a man who came all the way from Cadiz to Rome in

order to see Livy, and when he had done so immediately returned, as though the city had no other sights worth seeing. Livy may be considered to have written the national Roman epic, and thus to have succeeded admirably in the task which he set himself.—BIBLIOGRAPHY: J. E. B. Mayor, *Bibliographical Clue to Latin Literature*; M. S. Dimsdale, *History of Latin Literature*; Sir J. E. Sandys, *A Companion to Latin Studies*.



Lizards

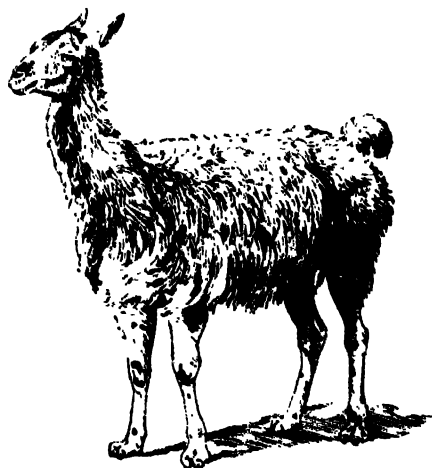
- 1, Nile Monitor. 2, Green Lizard. 3, Spiny-tailed Lizard.
4, Frilled Lizard. 5, Arizona Poisonous Lizard.

Lizard is the popular English name of numerous reptiles forming the ord. Lacertilia or Autosauri, and having usually two pairs of limbs, movable eyelids, and an elongated scaly body terminating in a tail. The lizards number more than 1600 species, accommodating themselves to all conditions except cold, and increasing in size and number in tropical regions. In some the tongue is thick and fleshy and in others it is divided, while in most cases it is protrusible. Some lizards are vegetable feeders; but for the

most part they are carnivorous and live upon small birds, insects, &c. The eggs are deposited and left to be hatched without care from the parents. Of the three species found in Great Britain the Common Lizard (*Lacerta vivipara*) is the most widely distributed, and ranges into Ireland, where it is the only reptile; the Sand Lizard (*Lacerta agilis*) is confined to Southern England; and the limbless snake-like Slow-worm or Blind-worm (*Anguis fragilis*) is common in woods and on moorlands. The chief families of lizards are the Scincidae, or Skinks; the Geckotidae, or Geckos; the Iguanidae, or Iguanas; and the Chamaeleonidae, or Chameleons. Poison glands are wanting in the lizards; the only exception being the Heloderma of Arizona and Mexico, which is capable of inflicting a poisonous bite by means of poison glands connected with grooved teeth.

Lizard Point, a headland of Cornwall, England, the southernmost point of Great Britain, with two lighthouses. Poldhu wireless station is in the vicinity.

Llama (li'ma or lyä'mä; *Lama lama*), an ungulate ruminating quadruped found in Latin America, closely allied to the camel, and included in the family Tylopoda. They differ from the camel in having no hump upon the back, in having a deeper cleft between the toes, in the callous pad of the foot being less developed, and in the interval between the canine and the back teeth being greater. The tail being short and the hair long and thick, the llama has the general appearance of a long-necked sheep, standing about

Llama (*Auchenia lama*)

3 feet at the shoulder. Of the four known species the guanaco (q.v.) and the vicuña (q.v.) are found in a wild condition, while the llama and the alpaca, varieties of the guanaco, have long

been domesticated. The llama is used by the inhabitants of Latin America to carry burdens after the manner of a camel. When loaded with about a hundredweight, it can travel some 14 miles a day across the mountain passes. They are gentle and docile creatures.

Llanberis (*lhan'be-ris*), a village of Carnarvonshire, North Wales, at the foot of the picturesque Pass of Llanberis, and between Llyn Padarn and Peris, a starting-point for the ascent of Snowdon (q.v.).

Llandaff (*Llan Tâf*, Church of the Tâf), an ancient city of Taff Vale, Glamorganshire, South Wales, in contiguity with Cardiff. It has been the seat of a bishopric since about the fifth century. The cathedral (twelfth century) is largely rebuilt, and the ruins of a castellated gateway of the episcopal palace remain. Pop. (rural district, 1921), 42,122.

Llandello-, or **Llandilo-beds** (*lan-dl'lo*), in geology, the name of one of the Ordovician series, derived from the town of Llandilo in South Wales.

Llandovery Series, the lowest division of the Gotlandian system, that is, of the system styled by Murchison Upper Silurian. It is named from a town in North-Eastern Carmarthenshire; but the series is probably best known in the classical Silurian area of the Welsh and English border. It is characterized by an abundance of the brachiopod *Pentamerus*. Large areas of Gotlandian rocks in other parts of the British Isles have been classed as of Llandovery age on account of species of this genus and of their characteristic graptolites, *Monograptus*, appearing here for the first time. The Llandovery beds are often united with the overlying Tarancon shales (Birkhill shales of Southern Scotland) under the name *Valentian*.

Llandud'no, a coast town and watering-place of Carnarvonshire, Wales, on a peninsula between Ormes Bay and the estuary of the Conway. It has a parade, promenade pier, and sea-bathing. In 1920 Llandudno 'adopted' Munetz in France. Pop. (1921), 19,290.

Llanelli, a seaport and municipal borough of Carmarthenshire, South Wales, on Burry Inlet, Carmarthen Bay. It gives name to one of the parliamentary divisions of the county. There is a floating and other docks, and Llanelli is the outlet for South Welsh coal and industrial products. Tin-plates are manufactured. Pop. 36,504.

Llangollen (*Alan-goth'en*), an urban district and town of Denbighshire, North Wales, on the Dee. Near Llangollen are Valle Crucis Abbey, the ruins of an ancient Cistercian foundation, and Plas Newydd, the residence of the 'Ladies of Llangollen'. The town bridge (1345) is regarded as one of the wonders of North Wales. Pop. (1921), 3680.

Llanos, the South American nomenclature for the pampas, prairies, or savannahs of the Orinoco Basin. During the dry winter their vegetation is burned up by the sun, and in the rainy season they are flooded with water. Between these two seasons the llanos produce rich guinea-grass and chaparral bushes, and are ranged by vast herds of cattle and horses. The Llano Estacado (Sp., Staked Plain) is an extensive plateau divided between New Mexico and Texas. It is comparatively barren.

Llanquihué, a southern province of Chile. It contains extensive natural forests covering some 1,400,024 acres, and is mountainous and well-watered. Llanquihué Lake is the largest lake in Chile; area, 225 sq. miles. The provincial occupations are mainly agricultural. Puerto Montt, a seaport, is the capital, with a wireless station, harbour accommodation, and exports of timber and wheat; pop. about 5000. Provincial area, 34,778 sq. miles; pop. (1919), 150,240.

Lloyd George, David, British politician, born 17th Jan., 1863, at Manchester, of Welsh parents. His father, William George, a poor schoolmaster, having died at the age of forty-four, the boy was brought up by his maternal uncle, a Baptist cobbler, in the village of Llanystumdwy, North Wales. Educated at the village National School, he afterwards studied for the law and became a solicitor.

Vehemently opposed to the dominance of the Church of England, the young solicitor soon became well known as a fighter for and champion of Welsh nonconformity and Welsh nationalism. His reputation increased, and at the age of twenty-five he became almost famous as the winner of a lawsuit concerning the right of burial of Nonconformists in parochial burying-grounds. In 1890, at a by-election, he was returned to Parliament as Radical member for the Carnarvon Boroughs, and has kept his seat ever since. He fought his way single-handed, and soon became conspicuous for his spirit of independence, his caustic wit, and his pungent utterances. During the South African War the fiery Welshman unhesitatingly espoused the Boer cause, even at the imminent danger of his life. Mobbed at Birmingham in 1900, he was at that time the most unpopular and best-hated man in Great Britain. When the Liberals came into power in 1905, Lloyd George was included in the Cabinet, formed by Sir Henry Campbell-Bannerman, as President of the Board of Trade, and was admitted to the Privy Council. During his tenure of office he passed the Patents and Designs Act, compelling manufacturers holding British patents to make their goods in Britain instead of abroad. He also passed the Merchant Shipping Act. In 1908 Mr. Asquith became Premier, and Lloyd George, whose repu-

tation was now firmly established, was appointed Chancellor of the Exchequer. As such he was responsible for the Old Age Pension Bill, and on 29th April, 1909, he presented to Parliament his famous Budget.

By the introduction of its drastic reforms and new taxations, this Budget became the foundation of a new social system in Great Britain, a system firmly established during the European War. A deficit of about £16,000,000 was to be expected, and had to be provided for without diminishing the cost of naval preparations, and increased taxation was the only remedy. The Chancellor of the Exchequer decided to 'rob hen-roosts'. His proposals were heavier taxes on spirits and tobacco, and a new tax on petrol for motor-cars, increases in the income tax, but above all a novel land tax and system of duties on land values. Financial London was aghast, and the Budget was rejected by the House of Lords; Parliament was prorogued, and a new election took place. The Budget was eventually passed. Returned to office, Lloyd George defended the Parliament Bill. In 1911 he presented another of his great reforms, the National Health Insurance Act against sickness, and announced his intention to introduce sweeping reforms in the English land laws, to break up the great estates, and to restore the land to the people. If Lloyd George had adopted an anti-war policy between 1899 and 1902, he was essentially a war-man, intent on achieving victory, in Aug., 1914. An enemy of half measures, he bitterly criticized those who waged the war half-heartedly. As Chancellor of the Exchequer he arranged for huge war loans, unprecedented in the history of the country. In the Coalition Cabinet of Mr. Asquith, formed in May, 1915, he was given the new portfolio of Minister of Munitions, and in June, 1916, he succeeded Lord Kitchener at the War Office.

When Mr. Asquith resigned, and Mr. Bonar Law had refused to form a ministry, Mr. Lloyd George consented to carry out the king's request, became Prime Minister, and for three years almost the dictator of the country. There were moments when dark clouds were gathering on the horizon, but the Prime Minister never lost heart. He carried the war to a successful issue, and was one of the most influential delegates at the Peace Conference, carrying his points against the other 'Big Three'—Clemenceau, Wilson, and Orlando. The outstanding political event of 1921 was the negotiation of the Irish settlement by Mr. Lloyd George. A conference held in London (21st–22nd Dec., 1921) between Mr. Lloyd George and M. Aristide Briand resulted in a call for a meeting of the Supreme Council at Cannes. As an outcome of this meeting (4th Jan.,

1922) a call was sent out for a conference of all the European states, to meet at Genoa, and a vote of confidence was accorded Mr. Lloyd George by the House of Commons prior to his departure for this meeting.—BIBLIOGRAPHY: J. H. Edwards, *From Village Green to Downing Street*; Edwards and Duparc, *Life of David Lloyd George*; Frank Dilnot, *Lloyd George: the Man and his Story*; Harold Spender, *The Prime Minister*.

Lloyd's Register. See *Insurance*.

Llullaillaco, a South American peak of the Andes, volcanic, and on the borders of Chile and the Argentine, around the line of 25° lat.; height, about 20,500 feet.

Loach, a small fish (*Nemachilus barbatulus*) inhabiting small clear streams in England and Southern Scotland, and esteemed dainty food. A smaller species, the spined loach or groundling (*Cobitis tenuis*), also occurs in England.—The name is also given to the eel-pout or burbot (*Lota lota*) and the three-bearded rockling (*Motella vulgaris*), a shore species.

Loadstone, or magnetite (q.v.), magnetic oxide of iron (Fe_3O_4). The ancients were acquainted with the singular property which it has, of attracting iron, and magnets received their name from the fact that they could be made by bringing iron rods into contact with magnetite. The mineral became known as the loadstone (lode-stone) or 'leading stone', and the term was used in poetic metaphor.

Loam, a soil compounded of various materials, but typically a sandy clay, neither too heavy nor too light for tillage-farming. Humus is found in loams in considerable quantities, and the soil is fertile in proportion.

Loan, anything lent or given to another on condition of return or payment. In law loans are considered to be of two kinds—*mutuum* and *commodate*; the former term being applied to the loan of such articles as are consumed in the use; the latter to the loan of such articles as must be individually returned to the lender. The acknowledgment of a loan of money may be made by giving a bond, a promissory note, or an IOU. In England the contract of loan may be proved by the lender's oath, supported circumstantial evidence, or letters of the borrower.

Loanda, São Paulo de, capital and seaport of Angola, Portuguese West Africa, and the seat of the High Commissioner. Loanda was founded in 1576 (the fort dating from 1578), and became a wealthy city through its traffic in slaves with Brazil. 'It is built upon a bay formed by a sand-spit thrown up by the Benguela current, and is near the Coanza, the source of its water-supply. Livingstone walked to Loanda in 1854 to open up a trade route from the Zambesi. The town has railway (metre gauge) connections with Malanje.

The exports are mainly rubber and coffee, and the imports textiles. Pop. 17,000.—BIBLIOGRAPHY: E. H. L. Schwarz, *South African Geography*; H. Masquardsen, *Angola*.

Loango, a West African coastal belt, divided among Portugal (Kabinda, Angola), France (Kwilu, Gabun Colony), and the Congo Free State at the Berlin Conference, 1885.

Loango, capital and port of Kwilu, Gabun Colony. There is no harbour, steamers lying to 3 miles outside the bar. The exports are mainly wild catoutchouc and palm-oil.—Cf. G. Bruel, *L'Afrique équatoriale française*.

Loan Societies, institutions established to lend money to the working-classes, receiving repayment by instalments, with interest. They are governed by the Loan Society Act, 1840, inapplicable to Scotland, and exempt from the provisions of the Money Lenders Act, 1900. The maximum loan is £15, and another loan cannot be made until the first has been repaid. £12 per cent per annum is the maximum chargeable rate of interest. The property of societies is vested in trustees, and they are under the inspection of the Crown.

Loasaceæ, a small family of polypetalous dicotyledons, natives of the Andes, mostly twining herbs with stinging hairs; allied to Passifloraceæ. *Mentzelia* (*Bartonia*) *aurea* and others are grown for their handsome or curious flowers.

Lobelia (named after Matthew Lobel, physician to James I of England), a very extensive genus of beautiful herbs, natives of almost all parts of the world, especially of the warmer parts of America, tribe Lobeliaceæ, nat. ord. Campanulaceæ. *L. inflata* is the Indian tobacco, which is cultivated in North America, and is employed in medicine. The small blue lobelia so popular in gardens is *L. Erinus*, a Cape species. A brilliantly scarlet-flowered species, *L. cardinalis*, is the cardinal-flower. *L. siphilitica*, an American species, possesses emetic, cathartic, and diuretic properties. Two species are found wild in Britain.

Lobeliaceæ, a tribe of Campanulaceæ, differing from Campanulaceæ proper in having irregular flowers, and like the Compositæ syn-genesious anthers, but otherwise resembling them very nearly.

Lobos, or **Seal Islands**, three Pacific islands in the Peruvian littoral, opposite Lambayeque, called Lobos-de-Tierra, Lobos-de-Afuera, and Punta Lobos respectively. They were described by Acosta in his *Natural History of the Indica* (1590). The two latter had large guano deposits.

Lobster, the common name of the macrurous (long-tailed), decapodous (ten-footed), stalk-eyed crustaceans, belonging to the genus *Homarus*. The first pair of ambulatory limbs bears the well-known and formidable lobster-claws. The abdomen possesses small forked limbs (swim-

merets), to which the eggs are attached. The tail consists of several flat shelly plates capable of being spread like a fan, and used as a swimming organ. They inhabit the clearest water, living in the crevices of a rocky bottom. The common lobster (*H. vulgaris*) is found in great abundance on many of the European shores. Very rich and nourishing dishes are made from the flesh of the lobster. They are generally in the best condition from the middle of October till the beginning of May. *H. americanus*, closely allied to the British lobster, is found on the coasts of North America. The so-called freshwater lobster is the crawfish or crayfish.

Lobworm (*Arenicola piscatorum*), a genus of Chætopoda or Bristle-worms. It has a round, obtuse head, a body about the size of a large earthworm, and respire through thirteen pairs of gill-tufts. Traces of the lobworm may be found on every sea-beach in the little coils of sand which it leaves when burrowing after the tide has ebbed. It is used for bait in deep-sea fishing. It is called also *Lugworm*.

Local Government is the term used to denote the government or management of the various subdivisions of a country, as distinguished from the supreme government. Its function is chiefly administrative and judicial; and it may be carried out by parishes, municipal boroughs, &c. In England and Wales a uniform system of local government was introduced by the Local Government (England and Wales) Act, 1888, based on the direct representation of the inhabitants, a principle already recognized in regard to urban communities. The administrative county, as defined by the Act, has been divided into electoral divisions, each returning one member to the county council. The electors of these county councillors are those persons, male or female, over twenty-one years of age who possess the qualification as occupier under the Representation of the People Act, 1918, and the wives (if over thirty years of age) of persons so qualified. The county councillors thus elected form three-fourths of the council, and the other fourth, called county aldermen, are selected by the council. The chairman is appointed by the council from among their number, and the councillors, after serving three years, retire together. Thus constituted, the



Lobworm (*Arenicola piscatorum*)

council has superseded quarter sessions in conducting the administrative and financial business of the county. Its powers and duties are the levying and expending of all county, hundred, police, and other such rates; the borrowing of money for a period not to exceed thirty years; the licensing of race-courses, pawnbrokers, houses for music, dancing, and stage plays; the management of asylums for pauper lunatics; the establishment and maintenance of school reformatories; the purchase and upkeep of bridges and roads; the appointment of a public analyst, a coroner, and a medical officer of health; the administration of the Acts relating to weights and measures, contagious diseases of animals, wild-fowl preservation, fish conservancy, explosives, and the pollution of rivers; the certifying of places of worship; and the opposing of Bills in Parliament. As regards the county police they are now managed by a joint committee of quarter sessions (that is, the justices of peace), and the county council. To defray its expenditure the council receives the proceeds of local taxation, licences, a portion of the customs and excise duties, and a grant from estate duty.

Many boroughs are now administrative counties. The mayor, aldermen, and burgesses of county boroughs have now, with modifications, the powers of a county council. The modifications are in those clauses which deal with the election and Constitution of the council, the appointment of its officers, the joint committee of Quarter Sessions and the Council, and the powers connected with the county and other rates, for these do not apply to the county boroughs. The adjustment of financial matters between the county and borough authorities is arrived at by mutual agreement, or if necessary by reference to the Commissioners appointed under the Act.

Under this Act, also, London by itself is erected into an administrative county. The area thus designated (which includes portions of Middlesex, Surrey, and Kent) has a lord-lieutenant, a sheriff, a commission of the peace, and a court of quarter sessions. Under this Act the number of county councillors for London is to be double the number of the members of Parliament for the Metropolitan boroughs; that is, the number of councillors is to be 118, and the number of county aldermen elected by these is to be not more than one-sixth of their number, or 19. In 1918 these numbers were raised to 124 and 20 respectively. To this council the powers, duties, and liabilities of the Metropolitan Board of Works are now transferred, that authority having ceased to exist. It is also provided that the powers, duties, and liabilities of county councils as defined by the Act and enumerated above shall apply to this London county council.

By an Act of 1899 the administrative County of London (the City excluded) was divided into 28 municipal boroughs, each with a municipal council, aldermen, and mayor.

The provisions for local government have further been extended by the Local Government (Scotland) Act, 1889, taking effect from May, 1890. By this Act a county council is established for the management of the administrative and financial business of each county. The county having been divided into electoral divisions, one councillor is elected for each division; the term of office is three years, and the whole number retire together. It is further provided that every burgh (that is, a parliamentary or royal burgh) which contains less than 7000 inhabitants becomes, for the purposes of this Act, merged in the county, contributes to its finances, and is entitled to be represented on the county council, the representatives being elected by the town council from among their own number. The powers and duties conferred on this county council are those which have been transferred from (1) the Commissioners of Supply, including such matters as apportioning the incidence of the land tax, the levying of county assessments, prison visiting, police management, lands valuation, division of old valued rent, &c.; (2) the powers and duties of the County Road Trustees; (3) the powers and duties of the Local Authority of the county under the Contagious Diseases (Animals) Acts and the Destructive Insects Act; (4) the whole powers and duties of the Local Authority under the Public Health Acts, with the exception of burghs and police burghs; (5) the administrative powers and duties of the justices of the peace of the county in respect of gas-meters, explosive substances, weights and measures, habitual drunkards, the Wild Birds Protection Acts, and lunatic asylums; but otherwise the powers and duties of the justices are to remain as heretofore. For the purposes of borrowing, for the management of police, and for the undertaking of works involving capital expenditure, a standing joint-committee of equal numbers is appointed by the county council and the Commissioners of Supply. As regards finance it is provided that after 31st March, 1890, certain duties and local licences collected by the Commissioners of Inland Revenue, together with eleven-hundredth parts of one-half of the proceeds of the probate duties, shall be placed at the disposal of the county council. The ordinary revenue, however, will be derived from the rates formerly received by the Commissioners of Supply, and by contributions from the burghs affected by the Act, but if this fund is found to be insufficient the county council is empowered to levy additional rates. All receipts of the council from whatever source shall be carried

to the county fund, and all payments shall be made, in the first instance, out of that fund. It is also enacted that the debts and liabilities of any authority whose powers and duties are transferred by the Act shall become the debts and liabilities of the county council.

By Acts of 1894, for England and Wales and Scotland respectively, parish councils were created (see *Parish*); and by the Education Act of 1902 the local administration of education was transferred to county councils, county boroughs, and similar authorities in England and Wales (to London in 1903). By an Act of 1898 county councils were set up in Ireland.—Cf. E. Jenks, *An Outline of English Local Government*.

Local Government Board, a Government department established in England and Wales in 1871, having under its supervision all matters of local government, public health, relief of the poor, registration of births, deaths, and marriages, &c. The president of the board was a member of the Government. Under it were inspectors, medical officers, clerks, &c. In 1919 it was abolished, and its functions taken over by the Ministry of Health. A similar board was established in Scotland in 1894. It had supervision over local authorities, and exercised varied powers under the Public Health Acts, the Sale of Food and Drugs Acts, the Diseases of Animals Acts, the Old Age Pension Acts, &c. It had six members, of whom three—the Secretary for Scotland, the Solicitor-General, and the Under-Secretary—were ex-officio members. The powers and duties of the Board have now been transferred to the Scottish Board of Health.

Local Option, a term applied to the principle by which a certain majority of the inhabitants or ratepayers of a certain locality may decide as to whether any, or how many, shops for the sale of intoxicating liquors shall exist in the locality. The principle was put into operation in Scotland in 1920 under the provisions of the Temperance (Scotland) Act, 1913. A poll was held in every area in which a requisition was signed by not less than one-tenth of the electors, the questions submitted being (a) no change, (b) limitation, and (c) no licence. In 87 per cent of the areas the electors voted against any change, and only about 7 per cent carried the no-licence resolution, the remaining areas favouring a reduction in the number of licences.

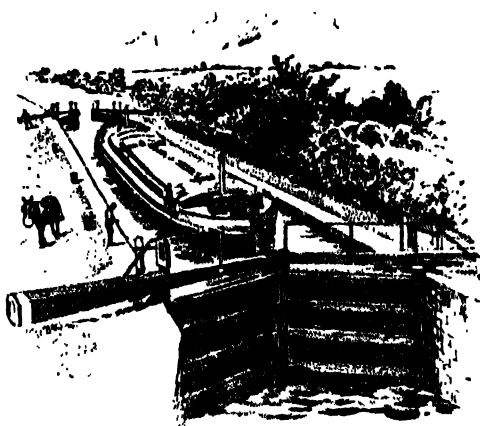
Locarno, a Swiss town on Lago Maggiore, taken from Milan in 1603, and Italian in everything but position. The ancient castle of the Visconti (partly demolished in 1518), and the pilgrimage church of Madonna del Sasso (founded 1480, rebuilt 1569) are the attractions.

Loches, a town of France, department of Indre-et-Loire, the ancient *Luacc*, grew out of a monastery founded by St. Ours about A.D. 500.

It was a residence of French kings, and the Tour Ronde, built by Louis XI, contained the iron cages invented by Cardinal Jean de la Balue, stated by Scott (*Quentin Durward*) to have died in one himself. Pop. 5000.

Lochmaben (loh-ma'ben), a royal burgh of Scotland, Dumfriesshire, 8 miles north-east of Dumfries, surrounded by seven lochs. Pop. (1921), 989.

Lock, a junction between two water-levels in a canal, used in raising and lowering boats from one level to the other. Substantial gates, usually of oak, are provided at each end, as well

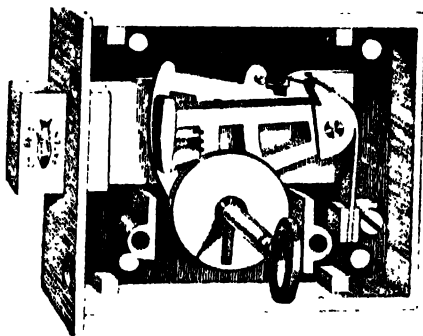


Lock in a Canal

as sluices cut through from the lock sides to the canal. When a vessel is descending, water is passed into the lock through the sluices until it is on a level with the higher end; the gate at that end is then opened and the boat allowed to enter. When the gate is closed, the level of the water in the lock is lowered by opening the outlet sluices, until the canal lower level is reached. The low-level gate is then opened, and the vessel can continue its journey. In ascending the operation is reversed. Where the difference of level is considerable, *inclines* or *lifts* may be employed.

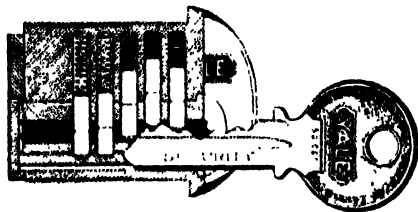
Lock, a key-controlled fastening for doors, drawers, or box lids. The simple bolt, held either open or shut by a spring, was in use until the end of the eighteenth century. Barrow introduced the lever lock (1778), in which the lift had to be exactly right to allow the bolt to pass. In the Chubb lock (1818) there are several pivoted levers or tumblers, which are lifted by the key to such positions that slots in them come into line and permit the passage of the bolt-pin, so that the bolt can be sent home by a spring. A detector or lever holds the bolt

firmly in place if any tumbler is raised too high, by a lock-picker for instance. The Yale lock also uses spring-held pins, but in place of a single pin there are two in each hole. When the key with its irregular edge is introduced to

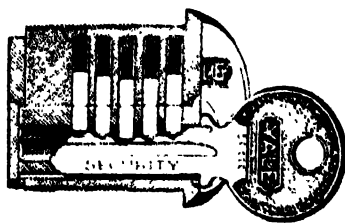


Chubb's Patent Detector Lock

its full extent, the divisions in the pins come into line with the edge of the barrel, and the barrel, which carries its motion to the bolt, can be turned. Combination locks have a number of discs, with a single notch in each, mounted on a



Key partly inserted



Key fully inserted

Yale "Cylinder" Lock in Section

common spindle. Each disc is turned by a pin on its neighbour. If the discs are moved round by means of the dial, so that all the notches are in line, the door can be opened. The dial is lettered or figured, and the order or combination can be changed at any time.

Locke, John, English philosopher, born 1632, died 1704. A graduate of Christ Church, Oxford, he applied himself to the study of medicine. In 1666 Locke made the acquaintance of Lord

Ashley, afterwards Earl of Shaftesbury, holding various offices under the patronage of that nobleman. In 1682 his patron retired from politics to Holland, Locke accompanying him in his exile. Owing to the internal troubles of his country, and the triumph of the opposition, Locke continued to reside abroad. He returned to England at the Revolution, and was appointed Commissioner of Appeals under the new Government. So early as 1670 Locke had formed the plan of his famous *Essay on the Human Understanding*, a plan which he had carefully elaborated in his exile, and which he published in its completed form in 1690. It was received with much opposition, notably by the University of Oxford, which resolved to discourage it; but despite this it acquired a great reputation throughout Europe, and was translated into French and Latin. Locke was made a Commissioner of Trade and Plantations in 1695, but retired when unable to perform his duties, and lived with his friend Sir F. Masham until his death. The chief purpose of Locke's celebrated *Essay* was to find the original sources and the scope of human knowledge. Among other works of Locke are his *Letters on Toleration*; *Thoughts concerning Education*; *Notes upon St. Paul's Epistles to the Galatians, Corinthians, Romans, and Ephesians*; and a *Treatise on the Conduct of the Understanding*. - BIBLIOGRAPHY: H. R. Fox-Bourne, *The Life of John Locke*; T. H. Fowler, *John Locke*; A. C. Fraser, *Locke*; G. E. Russell, *The Philosophy of Locke*; Sir L. Stephen, *History of English Thought in the 18th Century*.

Lockerbie, a town of Scotland, Dumfriesshire, celebrated for its August lamb fair, the largest in Scotland.

Locker-Lampson, Frederick, English man of letters, born 1821, died 1895. In 1857 was published his volume of occasional verse entitled *London Lyrics*, which passed through various editions and became very popular. In 1867 appeared his *Lyra Elegantiarum*, an anthology of "some of the best specimens of *vers de société* and *vers d'occasion* in the English language"; a subsequent production of his was entitled *Patchwork* (1870).

Lockhart, John Gibson, biographer of Sir Walter Scott, born 1794, and died at Abbotsford 1854. He studied at Glasgow and Balliol College, Oxford, and was called to the Scottish Bar in 1816. In 1817 he became a contributor to *Blackwood's Magazine*, then a new venture, and married Sir Walter Scott's daughter in 1820. From 1826, for twenty-seven years, he edited the *Quarterly Review*, and published many miscellaneous works; but the crowning effort of his career was reached with the publication (1838) of the last volume of his *Life of Scott*.—Cf. A. Lang, *Life and Letters of Lockhart*.

Lockport, a city of New York, United States, capital of Niagara county. The canal locks, formerly five, now two, are operated by electricity. It was founded in 1823, incorporated as a city in 1863, and has a large fruit trade. Pop. (1920), 21,308.

Lockyer, Sir Joseph Norman, astronomer, born 1836, died 1920. He was a clerk at the War Office (1857), and went to the Science and Art Department, South Kensington. In 1913 he became director of the Hill Observatory at Salcombe Regis (Sidmouth). He was director of several Government eclipse expeditions, president of the British Association (1903-4), and author of several books. He was a pioneer in the application of spectroscopy to the sun, established the existence of the chromosphere, and was the first to recognize helium. In 1869 he founded the scientific journal *Nature*.

Locle (loc), Le, a town of Switzerland, in the canton of Neuchâtel, an important watch-making center, the industry dating from its inauguration by D. J. Richa (1663-1741) in 1681. Pop. (1921), 12,441.

Locomotive While the continent of Europe was in the throes of the Napoleonic wars, a band of Englishmen—Trevithick, Blenkinsop, Blackett, Hedley, Dodds, and Stephenson, were working on locomotive designs and experiments, the pioneer work on which our modern railway traction is based. The Stockton and Darlington Railway was opened in 1825, when Stephenson drove a locomotive with thirty-four wagons. No great sensation was caused in those early days by the coming of the first steam engine until the opening of the Liverpool and Manchester line in 1830. The success of the *Rocket*, for which George and Robert Stephenson received the prize of £500 offered by the directors of that line, convinced the public of the soundness of the development, and led to the flotation of a great number of railway schemes in different parts of the country. The size of the locomotives grew as their use became commoner, and types suitable for particular classes of service and gradients were gradually evolved. In practically every component of the locomotive there are features which are different from the constructions having the same functions in stationary steam plants. The fire-box of a locomotive boiler differs from all other types in its form, which is almost cubical and open at the foot. The width of the lower part of the fire-box is of course limited by the space between the frames, but in the upper part limitations are not so exacting, and the width is made greater. The outer shell of the boiler at this end follows the lines of the fire-box, with a water space of about 4 inches between them. The boiler barrel is riveted to this outer shell and to the front tube-plate. The tubes are fixed

in the tube-plate and fire-box, and the whole structure is amply braced by tie-rods. The fire-bars rest on supports in the sides of the fire-box. The draught necessary for the combustion of the fuel is caused by the passage of the exhaust steam from a blast-pipe under the chimney. The valves which admit steam to and exhaust it from the cylinders are usually of the slide-valve type, sometimes balanced. The valves are operated by link motion or valve gear, generally Stephenson or Walschaert. Allan's link motion and Joy valve gear are also used to a limited extent. Superheating is common on express-type locomotives, in which some of the boiler-tubes are replaced by a smaller number of a much larger size, through which the superheater tubes pass from and to headers in the smoke-box. The Robinson, Schmidt, and Swindon are the most commonly used superheaters. The use of compound expansion of steam in locomotive engines is increasing, but its total use as yet is small. Oil-firing is not regularly used in Great Britain, but the fire-box fittings in use on some railways have been designed to suit an immediate change to that system to meet a coal-strike, or coal shortages through other causes. The boiler is covered with lagging material, such as asbestos mats and prepared felt under the steel or iron sheet covering.

Tank locomotives have the water-tank, and carry the fuel, on the same frame as the engine and boiler. The other types have a separate wagon, called a *tender*, for the water-tank and fuel. All locomotives are classified by the number of wheels in each of the three groups: those supporting the front end, the coupled driving-wheels, and the group supporting the back of the frame. For instance, the third engine shown on the plate is spoken of as a 2-6-4, because there are two leading wheels, six-coupled driving wheels, and four back wheels. Tank locomotives have been employed to a greater extent in Great Britain than in any other country. They are used for short-distance passenger trains, and also where the railway passes through large industrial districts. The present-day express passenger engine is one of four cylinders, with single expansion, using superheated steam, and having six-coupled driving-wheels, with a four-wheeled leading bogie. This class, 4-6-0, is also used for fast goods service. It is characterized by ample boiler capacity for gradients, and although the weight is considerable the axle loads are moderate. The 4-4-2, or Atlantic type, is used to a limited extent in Great Britain for heavy high-speed service. For goods traffic in non-mining areas a six-coupled locomotive finds favour, but where there is heavy mineral traffic, engines of 0-8-0, 2-8-0, or 0-10-0 classes are preferred. *Brimo-*

GRAPHY: *Railway Mechanical Engineering* (The Gresham Publishing Company); W. F. Pettigrew, *A Manual of Locomotive Engineering*; C. S. Lake, *The World's Locomotives*; C. E. Wolff, *Modern Locomotive Practice*.

Locomotor Ataxy, also known as *tubes*, is a peculiar disease of the nervous system, deriving its name from the fact that the sufferer from it cannot order the movements of his limbs for definite purposes. The patient requires to guide his feet and legs by means of his sight, and even then the feet are jerked out and brought down in a violent way. This difficulty of movement is called 'want of co-ordination of movement'. The disease is one of the late manifestations of syphilis. Its progress usually extends over a number of years, and there is no recovery.

Locris. The Locri were an ancient people of Greece, descended, according to Aristotle, from the Leleges. In historical times they were divided into two distinct tribes, eastern and western, of different customs, habits, and civilization. Of these the Eastern Locrians were the most ancient branch. They inhabited a narrow strip on the eastern coast of Greece, facing the Island of Eubœa, but their territory was divided by that of the Phocians into *Locri Epienemidii* to the north, and *Locri Opuntii* on the south. The western tribes inhabited *Locri Ozole* on the Corinthian Gulf, and were separated from *Locri Epienemidii* and *Opuntii* by the whole of Phœcis and Doris. *Locri Epizephyrii* (the ruins of which are near modern Gerace) was a Locrian city established on the south-eastern coast of the Bruttian Peninsula, Southern Italy.

Locust, the name of several insects of the ord. Orthoptera, allied to the grasshoppers and crickets. Their hind-legs are large and powerful, which gives them a great power of leaping.



Locust (*Pachytylus migratorius*)

Their mandibles and maxilla are strong, sharp, and jagged, and their food consists of the leaves and green stalks of plants. They fly well, but are often conveyed by winds where their own powers of flight could not have carried them. The most abundant species, *Pachytylus cinerascens*, ranges across the Old World from the Atlantic to the Pacific. A large species (*Schistocerca peregrina*) common in Northern Africa and North-West India is probably the Egyptian plague mentioned in *Erodus*. Locusts frequently swarm in countless numbers, darkening the air in their excursions, and devouring every blade

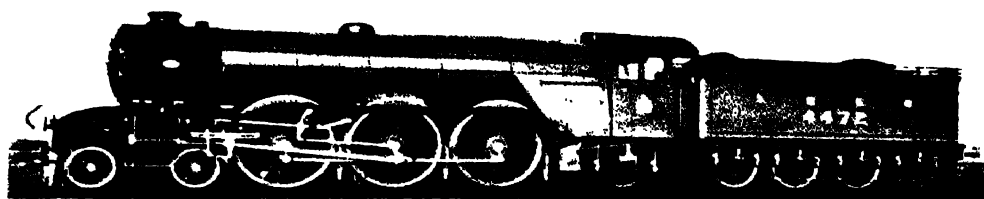
of the vegetation of the land they light on. They are destructive both in the larval, nymph, and perfect conditions. The Arabs and others use them as food. When dried in the sun, they are pounded up and baked into bread, or fried in oil as a delicacy. In America locusts are usually known as 'grasshoppers'. There are two specially destructive species, one of which, *Caloptenus femurrubrum*, is found in Northern New England and Canada; and the other, *Caloptenus spretus*, breeds abundantly west of the Mississippi. In the summer months this latter species commits widespread ravages in Texas, Kansas, and Colorado.

Locust Tree, or **Acacia** (*Robinia pseudacacia*, nat. ord. Leguminosæ), is found in the Eastern States of North America, but grows to its best in Kentucky and Tennessee. There it acquires a girth of 12 feet and a height of 80 feet. The leaves are pinnate, smooth, and prickly at the base; the flowers grow in pendulous racemes, white, fragrant, and producing smooth pods. The wood of the locust tree is highly valued for certain purposes, being close-grained, tough, light, and elastic in the best variety; it is reddish-tinted. It is used for house-work, fences, railway-sleepers, and cabinet-making.

Lodève (lo-dav), a town of France, department of Hérault. It is the ancient *Lutetia*, and under the Romans was known as *Forum Neronis*. The pre-Revolutionary cathedral, now the church of S. Fulcran, was founded in the thirteenth century. The bishopric dated from about A.D. 300. Cardinal Fleury was a native of Lodève. Pop. 6315.

Lodge, Sir Oliver Joseph, English physicist, born 1851. After acting for a time as assistant at the School of Mines, South Kensington, at University College, London, and at Glasgow University, in 1881 he was appointed professor of physics at University College, Liverpool, where he remained till 1900, when he became principal of Birmingham University, retaining this post until 1919. He was knighted in 1902. He was Rumford medallist of the Royal Society (1898), Romanes lecturer at Oxford (1903), president of the British Association (1913-4), and Albert medallist of the Royal Society of Arts (1919), as the pioneer in wireless telegraphy. He did a great deal of valuable work in electricity, was a popular lecturer of the highest order, and after the death of Lord Kelvin was regarded as the representative British physicist of the older school. He took an intense interest in psychical research. His son Raymond fell in the European War, and Sir Oliver wrote a book entitled *Raymond, or Life and Death*, which created some sensation. Among his other works are: *Modern Views of Matter, Electrons, The Ether of Space, Modern Problems, Man and the Uni-*

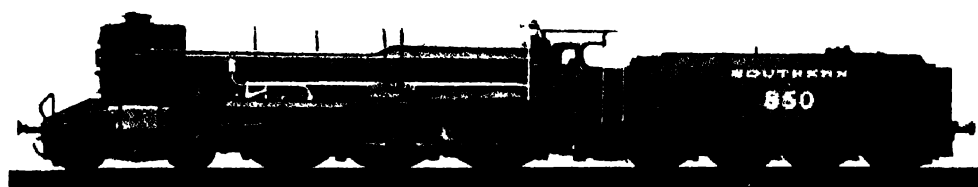
BRITISH STEAM RAILWAY LOCOMOTIVES



London and North Eastern Railway



Great Western Railway



South Coast Railway



Scotch Railway



London, Midland and Scottish Railway

verse, and *Christopher, A Study in Human Personality*.

Lodge, Thomas, English dramatist, born about 1558, died 1625. From Oxford University he entered Lincoln's Inn as a student. He wrote many fine lyrics and other verse; romances, including *Rosalynde*, *Euphues' Golden Legacie* (1590); and in conjunction with Greene the play *A Looking Glasse for London and England* (1594).

Lodger is a tenant who holds part of a house in his exclusive possession, while the landlord or his agent or tenant-in-chief holds possession over the house as a whole. What is known as the *lodger franchise* (parliamentary) was established in England under the Representation of the People Acts of 1867 and 1868. By it any male lodger of full age who occupied rooms for a year continuously previous to the last day of July in any year in the same house, and paid for such rooms, if unfurnished, a yearly rent of at least £10, or if furnished a rent equivalent to one of £10 or more for unfurnished lodgings, might have himself registered as a voter for that year; but if his right to vote was to continue his claim had to be renewed every year. This franchise could originally be held only in boroughs, but the Act of 1884 extended it to counties. Now, by the Representation of the People Act, 1918, the condition of rental value has been abolished, and the qualifying period has been reduced to six months, ending on 15th January and 15th July, and otherwise altered. The franchise has, further, been extended to any female lodger who has attained thirty years of age and to whom the room or rooms have been let in an unfurnished state.

Lodi, a town in Italy, province of Milan, on the Adda. Not far from the bitter enemies of Milan in medieval times. Lodi was founded by Frederick Barbarossa (1162), and has an ancient cathedral. Lodi was taken by the modified Gorgonzola) is made in the neighbourhood. The terrific battle for the city of Lodi, 10th May, 1796, ended with the exit of the Austrians by Massena, and earned for Napoleon the title of 'Le Petit Caporal' and made him master of Lombardy. Pop. 17,300.

Lodz, a town of Piotrkow, Poland, on the Lodka, next in importance after Warsaw, and one of the world's cotton manufacturing centres. It is the head-quarters of a Polish general military district, and was the fifth city of Russia before the creation of the Polish state. During the European War the town was taken by Hindenburg after the Russian evacuation, 5th Dec., 1914. Pop. 429,775.

Loess (pronounced leus), a German term applied to a finely comminuted sand or pul-

verulent calcareous loam of a yellowish colour which occurs as a deposit sometimes of great thickness, chiefly in the valleys of the Rhine, the Danube, the Hoang-Ho, the Missouri, and various other rivers, forming a highly fertile soil. It originates in the sifting by winds of dry alluvial matter, spread out in plains by rivers or by former ice-action; the fine loamy matter accumulates against uplands, and increases in thickness as vegetation grows upon it. Deserts may often be regarded as the barren residues from which fine earth has been removed to form fertile loess-lands elsewhere under the influence of prevalent winds.

Lofoden Islands, a jagged group off the Norwegian coast, 2° within the Arctic Circle, separated from the Vesteralen group by the Raftsund, and from the mainland by the Vestfjord. They are very mountainous, and the combined peaks have been termed the 'Lofoden Wall'. The Lofoden fishery, prosecuted on the east of the group, accounts annually for millions of cod, which are dried, usually on wooden frames, after being cleaned. Thousands of boats take part from all parts of Norway, to whom the islands belong. A German factory dries and pulverizes the waste fish-heads for use as fish guano. The Maelström (q.v.) lies south of the Lofodens.

Log, an apparatus for measuring the speed of ships at sea. The hand log, invented about 1600, was superseded by patent logs of the



Rotator of the 'Trident' Log

'Cherub' and 'Neptune' types, and these in turn are giving place to the 'Trident' and 'Forbes' types.

The hand log consisted of a flat wooden board forming a quadrant of a circle of 6 inches radius, and lead ballasted on the curved part to swim with its plane vertical and the greater part immersed. When dropped over the stern and deprived of the ship's momentum, the log was left behind. The length of line payed out in a given time indicated the approximate speed of the vessel.

Patent logs generally comprise a rotator, line or cable, and a register. The 'Trident' type is practically identical with the 'Neptune', and is specially designed for registering high speeds (18 knots upwards). The rotator is submerged at the end of the line and connected with an electric register, ticking off each tenth of a mile, and communicating with the fore-bridge

indicator. Forbes's ship's log and speed indicator registers distance, and actual speed in knots. The recording device can be situated anywhere within the ship, and any alteration of speed may thus be observed immediately, an important matter in turbine vessels, where it may be due to propeller-slipping. See *Knot*.

Loganiaceæ, a natural order of tropical dicotyledonous plants, consisting of trees, shrubs, and herbaceous plants, some of which, as the members of the genus *Strychnos*, are remarkable for their poisonous qualities. They have opposite, entire, stipulate leaves, calyx four- or five-parted, corolla four-, five-, or ten-cleft, and stamens varying in number.

Logansport, a city of Indiana, United States, at the junction of the Wabash and El Rivers. It was incorporated as a city in 1838, and has trade in agricultural goods and timber. Pop. (1920), 21,626.

Logarithms. The common logarithm of a number is the index of the power to which 10 must be raised to be equal to the number. Thus $10^3 = 1000$, so that the logarithm of 1000 (usually written $\log. 1000$) is 3. Now $10^1 = 10$, $10^2 = 100$, $10^3 = 1000$, $10^4 = 1,000,000$, and (see *Eapenent*) $10^0 = 1$, $10^{-1} = 0.1$, $10^{-2} = 0.01$, &c., thus:

$\log. 0.001$	$\log. 10 = 1$
$\log. 0.01$	$\log. 100 = 2$
$\log. 0.1$	$\log. 1000 = 3$
$\log. 1$	$\log. 10,000 = 4$

It is evident that the logarithm of any number greater than 1 and less than 10 is fractional; the logarithm of any number greater than 10 and less than 100 is greater than 1 and less than 2. Again, the logarithm of any number less than 1 is negative. Suppose we wish to know the logarithm of the number 18.1. In a book of tables we only find the fractional part of the logarithm; it is .257079. Now 18.1 is greater than 10 and less than 100, so that its logarithm is greater than 1 and less than 2; hence $\log. 18.1 = 1.257079$. The integral part of a logarithm is called its *characteristic*, the fractional part its *mantissa*. Logarithms make arithmetical computations more easy, for by means of a table of them the operations of multiplication, division, involution or the finding of powers, and evolution or the finding of roots, are changed to those of addition, subtraction, multiplication, and division respectively. For instance, if x and y are the logarithms of any two numbers, the numbers are 10^x and 10^y ; now the product of these numbers is 10^{x+y} , so that the logarithm of the product of two numbers is the sum of the logarithms of the numbers. Again, the quotient of the numbers is 10^{x-y} ; so that the logarithm of the quotient of two numbers is the difference of the logarithms of the numbers. Again 10^x raised to the n th

power is 10^{nx} ; so that the logarithm of the n th power of a number is n times the logarithm of the number. Logarithms of this kind are *common logarithms*, and were invented by Briggs; their *base*, as it is called, is 10. Logarithms were first used by Napier of Merchiston (see *Napier, John*). There is another number in common use as a base, namely, the number 2.7182818..., or the sum of the infinite series $2 + \frac{1}{2} + \frac{1}{2^2} + \frac{1}{2^3} + \frac{1}{2^4} + \&c.$ This base is denoted by e in mathematical treatises, and the *Napierian* logarithm of any number, say 7, is written $\log_e 7$, to distinguish it from $\log. 7$, which is the common logarithm, whose base is 10. The common logarithm of a number is found from the Napierian by multiplying by 0.43429448. Napierian logarithms are of great importance in the higher mathematics, the chief reason being that the derivative (see *Calculus, The Infinitesimal*) of $\log_e x$ is the very simple function $1/x$, and the integral of $1/x$ is $\log_e x$; this integral is very common in applied mathematics. The function $\log_e(1+x)$ can be expanded in ascending powers of x , if x lies between 1 and -1. The expansion is (see *Maclaurin's Theorem*) $\log_e(1+x) = x - \frac{1}{2}x^2 + \frac{1}{3}x^3 - \frac{1}{4}x^4 + \dots$

Log-book, an official book carried on board ship, except in ships trading exclusively between ports on the Scottish coast, in a form approved by the Board of Trade. Every entry must be signed by the master and by the mate or some other of the crew, in the case of illness by the surgeon, and in the case of wages by the seaman or officer authorized. Entries must be made of every conviction of a member of the crew, with the punishment inflicted, and of every offence which it is intended to prosecute. A statement is made of the character, conduct and qualification of each of the crew; illness or injury happening to them; marriages taking place on board; name of every member or apprentice ceasing to be a member of the crew; collisions and any other matter directed to be entered. The master of every British ship must enter in the official log-book or keep a record of every occasion on which the life-saving appliances have been examined, and produce such records for inspection. There is no regulation, however, requiring compulsory boat-drill, which is regarded as a serious omission. A fine is imposed for failure to keep a log-book, or for destroying, mutilating, or rendering illegible any entry. Log-books must be delivered to the Superintendent of Mercantile Marine within forty-eight hours of a foreign-going ship's arrival at her final port in the United Kingdom, and in the case of transfer of a ship or her loss it must be sent home. Log-books of home ships are transmitted half-yearly.

Logic, the science of correct thinking, the main subjects of which it treats being reasoning, together with the operations of the mind

subsidiary to reasoning. Its chief aim is to ascertain the principles on which all valid reasoning depends, and which may, therefore, be applied as tests of the legitimacy of every conclusion that is drawn from premises. When a theory is enunciated, a statement made, or an opinion expressed, we listen to and understand them, but they do not impress themselves on our mind until proved. We analyse and test them, and, if they are correct, we arrive at such judgments as necessarily impress themselves upon our minds and upon those of others. We arrive at conclusions that strike us as certainly true. If we act in this way, we are said to think logically or correctly. Many a man performs the logical operations of the mind without reflecting upon the theory of the process. He observes the laws of correct thinking without knowing them, nay, even without being aware of their very existence. Logic teaches us not only how we think and must think, but also how we *ought* to think. It analyses correct reasoning and the process by which we arrive at a valid conclusion, and it shows the invalidity and fallacy of thought that does not conform to the rules.

In our search for truth we not only endeavour to arrive at a valid result, but to arrive at it promptly and by the quickest way. We employ various modes or methods which we deem best and most convenient for our purpose. The ways or procedure, or the *methods*, are various: *inductive* or *deductive*, *analytical* or *synthetic*. The inductive or analytical method is that which, proceeding from fact and knowledge gathered by experience, endeavours to establish general principles and universals (analysis, from Gr. *analysis*, *ana* + *lyein*, to loose, cutting the whole into parts). The deductive or synthetic method, on the contrary, proceeds from general notions, putting them together and then trying to deduce a result and predict an event. It is called synthetic from synthesis (Gr. *syn* + *tithenai*, to set), combining or putting together the parts into a systematic whole. The inductive or analytical method is also called *regressive*, for it proceeds regressively in its investigations, from the individual or particular judgment based upon experience to universal propositions and real principles. The deductive or synthetic method is called *progressive*, as it proceeds progressively, from universal notions to particulars which we know from experience and are able to control by means of our senses.

The older school of logicians agreed on the whole in considering logic as mainly treating of reasoning and the operations of mind subsidiary to reasoning; and this definition sufficiently indicates the view of the science held by such logicians as Whately and Hamilton. According to them, logic dealt only with the *form* of thought, that

is, with what is common to all reasonings, judgments, and concepts respectively, and had nothing to do with the *matter*, that is, the subject or content of reasonings, judgments, &c. In this view the science of logic was merely *deductive*, and the syllogistic process, or the intellectual act performed in deducing particular truths from general truths already given, was the main subject of the science. It is evident, however, that in practical research the process by which the mind reaches general truths from the observation of particulars is at least of equal importance. It is upon this process, regarded as the more important element in inference and the ascertainment of truth, that John Stuart Mill founded his new system of *inductive logic*. The nature of scientific evidence, and the methods and principles involved in scientific research, are the chief subjects of study in this system of logic. Very different from both of these are the conceptions of logic given by the chief German philosophers. Kant, in declaring that only the matter (not the form) of experience was given to the mind, had recognized thought as the essential factor of cognition, and had initiated a new so-called *transcendental logic*, which was an analysis of the general conditions under which the objective world became cognizable. Thus the foundation was laid for a view of reality as in its very nature constituted by thought. Thought or the *ego* is itself the real, and there being no separate reality, logic becomes the system of the forms in and through which thought or intelligence is realized. Logic thus appears, as in Hegel, a complete theory of knowledge and a metaphysic. The earliest work on logic is the *Organon* of Aristotle, who practically gave the science the shape it possesses.

BIBLIOGRAPHY: W. S. Jevons, *Elementary Lessons in Logic*; T. Fowler, *Logic, Deductive and Inductive*; F. H. Bradley, *Principles of Logic*; J. S. Mill, *System of Logic*; W. H. S. Monck, *Introduction to Logic*; H. Lotze, *Logic*; W. Wundt, *Logik*; A. S. Rappoport, *A Primer of Philosophy*.

Logographers, a term in Greek literature for certain early historical writers previous to Herodotus, using the Ionic dialect, and making no attempt to discriminate between history and legend. The principal logographers were Hecataeus of Miletus, Acusilaus of Argos, Charon of Lampsacus, Hellanicus of Mytilene, and Xanthus of Sardis.

Logos (Gr., word, thought, reason), in Christian theology, a word used in certain passages of the Scriptures, which has been the source of continual disputes ever since the third century of our era. The passage in the Bible which gives rise to this discussion is the opening of the *Gospel of St. John*: "In the beginning was the Word, and the Word was with God, and the Word was God. The same was in the beginning with God.

All things were made by him, and without him was not anything made that was made," &c. In the Greek text the expression here translated *Word* is *logos*, and the question is, what we are here to understand by *logos*, whether a person of the Deity, the creative intellect of God, or the Son, through whom he created, or the divine truth which was to be revealed, or something else. —BIBLIOGRAPHY: E. Caird, *Theology in the Greek Philosophers*; A. Harnack, *History of Dogma*; W. R. Inge, *Personal Idealism and Mysticism*.

Logroño (lo-grōn'yō), a walled town of Spain, capital of the province of Logroño, on the Ebro. It is the centre of the Rioja wine district, and was the Roman *Lucromius*. Pop. 19,000. The province, in the north, where it borders the Ebro, is level, fertile, and celebrated for its wine, but in the south is generally mountainous and barren. It is rich in minerals, but is quite undeveloped in this respect. Area, 1940 sq. miles; pop. 182,380.

Logwood, a popular name for the *Hæmatoxylon campechianum*, a tree belonging to the nat. ord. Leguminosæ, which grows in moist and swampy places in Central America, and parti-



Logwood (*Hæmatoxylon campechianum*)

cularly round the Bay of Campeche; but is now naturalized in Jamaica and many of the West Indian islands. The tree is usually from 40 to 50 feet high, with pinnate leaves and small yellowish flowers. The wood is red in colour, tinged with orange and black, so heavy as to sink in water, and susceptible of receiving a good polish. It is used chiefly as a dyewood, the trees being cut down, the bark and alburnum removed, and the hard centre parts cut into 3-foot-long logs. To obtain the colouring-matter it is hewn

into much smaller pieces, and ground or rasped to small chips, or to a coarse powder. The aqueous extract is muddy and of a reddish-brown colour. By acids the red colour is made paler; by alkalis it is converted to purple. By mordanting the fabric with iron, black is produced; with alumina, violet and lilac; with copper, blue; and with chromium, a black or green. The colouring power of logwood depends chiefly on a crystalline ingredient called hæmatoxylin. It is employed in calico-printing to give a black or brown colour, and also in the preparation of some lakes. An extract of logwood is used in medicine as an astringent.

Loh'engrin, son of Parsifal, the hero of a thirteenth-century German romantic poem, and a Knight of the Holy Grail. Sent by King Arthur to help Elsa of Brabant, he arrives in a car drawn by a swan, delivers the princess from captivity by overcoming her enemy Telramund, and marries her; accompanies the emperor in a campaign against the Hungarians, and fights against the Saracens. He then returns to his bride at Cologne, but being pressed by her to state his origin he is prevailed upon to tell it, the car and swan reappearing at once, when he must, in terms of his vow, return to the Grail. The legend inspired Wagner's opera *Lohengrin*, first produced at Weimar on 28th Aug., 1850, under the direction of Liszt (q.v.).

Loir (lwar), a river of North-West France, rising in Eure-et-Loir, traversing Loir-et-Cher and Sarthe, and falling into the Sarthe a few miles above its junction with the Loire; length, 180 miles.

Loire (lwär; ancient *Liger*), the longest river of France, which it divides into two nearly equal portions. It rises on the western slope of the Cévennes, in the department of Ardèche, and flows generally N.N.W. and W. till it falls into the Bay of Biscay below Nantes. Its principal affluents on the right are the Arroux, Sarthe, Nièvre, and Maine; on the left the Allier, Vienne, Cher, and Indre. Below Nantes, where it first feels the influence of the tide, it is more an estuary than a river, and is studded with islets. Above Nantes navigation is much impeded by shallows. Its whole course is about 600 miles. The river is much subject to disastrous inundations, and dikes have been constructed along its course. The largest of these is what is known as the *Levéé* of the Loire, extending for about 40 miles below Saumur. Its origin dates as far back as the time of Charlemagne. The river is connected by canals with the Saône, Seine, and Vilaine.

Loire, a central department of France, in the Loire basin; area, 1852 sq. miles. Much wine is produced, and coal is raised, part of the department being in the Loire coal-field, the

most important in France. The capital and industrial centre is St. Étienne; other towns are Roanne and Montbrison. Pop. (1921), 687,180.

Loire, Haute- (ŏt-lwâr; Upper Loire), a department of South-Eastern France; area, 1980 sq. miles. It is traversed by the Loire, is surrounded on all sides by the Cévennes, and has the character of a plateau intersected by deep river valleys. The chief industry is the manufacture of lace, largely a home industry. Le Puy is the capital. Haute-Loire once belonged to the Counts of Toulouse, but was united to the Crown of France in the thirteenth century. Pop. (1921), 268,893.

Loire-Inférieure (lwâr-an-fâ-ri-cur; Lower Loire), a western maritime department of France, intersected by the Lower Loire and its tributary; area, 2093 sq. miles. The surface is flat. The coast is much indented, and covered with salt marshes. Lagoons and lakes are numerous. The largest is Grandlieu; area, 24 sq. miles. The products are grain, sugar-beet, and large quantities of wine. The oak forests pasture great numbers of swine, and shipbuilding with its allied trades is carried on to a considerable extent. Wine, salt, corn, and cattle are exported. The principal ports are Nantes (the capital) and St. Nazaire. About the middle of the fifth century inhabitants of Great Britain, expelled by the Saxons, took refuge here and founded the Kingdom of Brittany. At the beginning of the sixteenth century the whole district was united to the Crown of France. Pop. (1921), 649,723.

Loiret (lwa-râ), a central department of France; area, 2629 sq. miles. The surface is partly flat, partly undulating, with scarcely any hills, and is traversed by the Loire, which divides it into two unequal portions. The Loiret is a tributary of the Loire. The chief products are grain and wine. Pottery and porcelain are manufactured. It was united to the French Crown by Hugh Capet. Orleans is the chief town. Pop. (1921), 337,224.

Loir-et-Cher (lwâr-ê-shâr), a central department of France; area, 2478 sq. miles; traversed by the Loire, Loir, and Cher. Hemp, beet for sugar, wine, fruits, and cereals are produced, and horses, cattle, and sheep are reared. From the time of Louis XII it was frequently the residence of the court, a circumstance which accounts for the remarkable number of châteaux in which the department abounds. The capital is Blois. Pop. (1921), 251,528.

Lofa, a town of Granada, Spain, in the Genil Valley, with a trade in cereals and cattle, and manufactures of leather, silk, and woollens. Pop. 20,000.

Lofa, or **Lofa**, capital of the southernmost province of Ecuador bearing the same name, and in the Casibamba Valley. It is in the gold-

silver-, and copper-mining district, and has a cathedral founded in 1540. It is 6900 feet in altitude. Pop. 12,500.—The province is famous for its cinchona forests and exports of cinchona bark. Area, about 7000 sq. miles; pop. about 66,000.

Lok, or **Loki**, in Scandinavian mythology, the evil deity. He did not belong to the race of Æsir, but to an older dynasty. He is a personification of the principle of evil, described as of handsome appearance, but perpetually engaged in works of wickedness partly directed against the other gods.

Lo'keren, a manufacturing town of East Flanders, Belgium, on the Durme, producing cottons, lace, soap, and tobacco. Pop. 22,500.

Lokman, a traditional Arabian fabulist, seer, or prophet, represented as the author of a collection of fables of later date than the Hejra. In the *Koran* there is an account of a Lokman the Wise who lived at a time anterior to that of King David. The fables of Lokman were made known to Europe by Erpenius (Leyden, 1615). They were published in Arabic, with a Latin translation.

Lollards, a name which arose in the Netherlands about the beginning of the fourteenth century, and was applied as a term of contempt to various sects or fraternities deemed heretical. The name became well known in England about the end of the fourteenth century, when it was applied to Wycliffe and his followers. The Wat Tyler revolt of 1381 was directly connected with the Lollards, who drew on themselves the enmity of the civil powers. Numbers of them were put to death, especially during the reign of Henry V, when apparently another revolt was intended. Lollardy persisted till the Reformation, for which it had done much to prepare the English people. —BIBLIOGRAPHY: E. Powell and G. M. Trevelyan, *The Peasants' Rising and the Lollards*; J. Gairdner, *Lollardy and the Reformation in England*.

Lombard, Peter, one of the most celebrated of the schoolmen, born at Novara, Lombardy, about 1100. He was a scholar of Abelard in the University of Paris, and through the influence of Bernard of Clairvaux he became a teacher of theology. In 1159 he became Bishop of Paris, where he seems to have died in 1164. His work *Sententiarum Libri Quatuor* is a classified collection of the opinions of the Fathers on points of doctrine, with a statement of the objections made to them, and the answers given by Church authorities. Hence he is known as the Master of Sentences (Magister Sententiarum). For five hundred years the *Book of Sentences* served as the basis of numerous theological lectures and treatises.

Lombard Architecture. See *Architecture*.

Lom'bards, or **Langobardi**, a Teutonic people who at the beginning of the Christian era were dwelling on the Lower Elbe. With the help of the Saxons and others they conquered North Italy, where they settled, calling the district Lombardy. Their capital was Pavia. The power of the Lombards gradually declined, and in 773 Charlemagne captured Pavia after a six-months' siege and added Lombardy to his own empire. Cf. T. Hodgkin, *Italy and her Invaders*.

Lom'bardy, modern *compartimento territoriale* or political division of Upper Italy, deriving its name from the Lombards. At first it extended from the Adriatic to the Savoyan Alps. After the overthrow of the Lombard Empire a number of independent duchies and republics, Mantua, Milan, Venice, Genoa, &c., evolved, originally fiefs of the Holy Roman Empire, but practically independent. On the west side the growth of the House of Savoy ultimately absorbed all minor principalities to the line of the Ticino, while the extension of the Venetian authority during the sixteenth century over the districts to the east restricted the use of the name of Lombardy to the country west of the Lago di Garda and the Mincio, a district which passed under the dominion of Austria in 1706, and was ceded by that power to Italy in 1859. The modern *compartimento* embraces eight provinces (Bergamo, Brescia, Como, Cremona, Mantua, Milan, Pavia, and Sondrio), with an area of 9333 sq. miles and a pop. of about 4,006,325.—Cf. Countess Martenengo Cesaresco, *Lombard Studies*.

Lombok, an island of the Sunda group, Dutch East Indies; of volcanic origin. It is mountainous and traversed by two ranges, between which the valley yields rice, cotton, maize, coffee, and tobacco. The ranges culminate in the peak of Rinjani (12,382 feet). Mataram (capital) and Ampanam (port) are the chief towns. The Dutch have occupied the island since 1804. Area, about 3000 sq. miles; pop. about 403,530.

Lombroso, Cesare, criminologist, born, 1836, at Verona of Jewish parents, died 1909. He studied at Turin, became an army surgeon, and was appointed to the chair of psychiatry at Pavia in 1862, transferring later to Turin. His work was mainly connected with criminal insanity, the connection between genius, insanity, and crime, and anthropometry in its relation to criminality. He is famous for his *L'Uomo Delinquente* (The Criminal; 1885). His theory as promulgated is that the anomalies of the criminal type, physical and mental, are due partly to degeneration and partly to atavism. The congenital criminal is on quite a different plane to the occasional criminal; genius is not altogether

removed from insanity, and is in some respects analogous to crime.—Cf. H. Kurella, *Cesare Lombroso: a Modern Man of Science*.

Lomond, Loch, the 'Queen of Scottish Lochs', and the largest, renowned for its scenic beauty. It is 24 miles long, and 600 feet deep in parts of the narrows. It is the *Leamanonius Lacus* (lake of the elms) of Ptolemy, and is drained by the Leven. The southern part of the loch is island-studded, and Inchmurrin contains a castle of that name. Ben Lomond (3192 feet) towers above Tarbet on the opposite shore. Fish, including salmon, trout, and pike, are abundant. A regular steamer service is maintained from Balloch in the south, and a railway connects Ardlui in the north with Glasgow and the Clyde.

Lomza, a town of Poland, capital of a province of the same name, on the Narev, a tributary of the Bug. Pop. 23,000. The province of Lomza covers an area of 4700 sq. miles. The country is flat and suitable for agriculture and stock-raising.

London, the political and commercial capital of the British Empire, and by far the largest city in the world. It is situated upon the River Thames, covering an area of 443,449 acres, and having a pop. of 7,476,168 in 1921 (7,251,358 in 1911, and 6,581,402 in 1901). This area is known as Greater London, which includes the City, the counties of Middlesex and London, and parts of Kent, Surrey, Herts, and Essex; technically, any parish within 15 miles of Charing Cross is in Greater London. The administrative county of London and City of London has an area of 74,850 acres, and a pop. of 4,483,249 in 1921 (4,521,685 in 1911, and 4,536,267 in 1901), all under the jurisdiction of the London County Council. The City of London proper is a comparatively small place, comprising 673 acres and a floating population. It is almost entirely the business quarter, and is a separate municipality with a civic corporation, the Lord Mayor of London being at its head. London consists of a number of quarters or districts, the most important of which form separate parliamentary boroughs, though there are many other equally familiar minor districts, such as Shepherd's Bush (known through the Franco-British and other gigantic exhibitions, and as a barracks during the European War), Whitechapel, Spitalfields, Pimlico, Bloomsbury, and Belgravia.

An unofficial division of London is into the west, or fashionable quarter, and the east end, the great seat of trade and manufactures. The general appearance of London is not attractive, much of the architectural beauty being lost by overcrowding and badly-chosen sites; but what impresses a stranger is not so much the design of the buildings as the number of them, and the

immensity of the Metropolis can only be realized by actually travelling about within it.

London Parliamentary Boroughs.	Population in 1911.	Population in 1921.
Battersea	167,743	167,603
Bermondsey	125,903	119,435
Bethnal Green	128,183	117,238
Camberwell	261,328	267,235
Chelsea	66,385	63,700
City of London	10,657	13,706
Deptford	109,496	112,500
Finchbury	87,923	76,010
Fulham	153,284	157,014
Greenwich	95,068	100,493
Hackney	222,533	222,150
Hammersmith	121,521	130,287
Hampstead	85,495	86,080
Holborn	49,357	42,796
Islington	327,403	330,028
Kensington	172,317	175,680
Lambeth	208,058	302,960
Lewisham	160,834	174,104
Paddington	142,551	144,273
Poplar	162,442	162,618
St. Marylebone	118,160	104,222
St. Pancras	218,387	210,086
Shoreditch	111,390	104,308
Southwark	101,007	184,888
Stepney	279,804	240,738
Spike Newington	50,659	52,167
Wandsworth	311,360	328,656
Westminster	160,261	141,317
Woolwich	121,376	140,493

Note.—These boroughs are treated under their individual headings, and it is the City of London that is mainly dealt with here.

Buildings.—As the capital of the empire London is the residence of the sovereign and court, Buckingham Palace being the king's official residence, and St. James's Palace that of the Prince of Wales. Marlborough House and Kensington Palace are also royal residences. As the empire's administrative centre, London also contains the Government offices, and these are mainly located in and contiguous to Whitehall, although during the European War a policy of expansion and decentralization resulted in the impressment of all available hotels, no matter how far distant, as administrative offices, and this policy was even extended to the erection of innumerable temporary buildings in public parks and open spaces. Westminster Hall, adjacent to the Houses of Parliament, was erected by William Rufus, and was formerly the seat of the Supreme Court. Adjoining the City, on the east, is the Tower, the ancient citadel of London, on the bank of the Thames. Other noteworthy buildings are the Houses of Parliament, Law Courts, Bank of England, Royal Exchange, Mansion House, Guildhall, and the four Inns of Court. Among churches are St. Paul's Cathedral and Westminster Abbey. There are many monuments: the Nelson Column in Trafalgar Square is 176½ feet high, with four colossal lions by Landseer adorning the base; the national memorial to Prince Albert is 176 feet high; the enormous memorial to Queen Victoria, constructed of white

marble, is conspicuous before the gates of Buckingham Palace; and a simple cenotaph in Whitehall perpetuates the memory of the 'glorious dead' who fought in the European War.

Transport.—A labyrinth of railway lines converges on London. Grouped round King's Cross are Euston, St. Pancras, and King's Cross, terminal stations of the northern systems. From Victoria lines radiate in all directions, but mainly south, east, and west. Waterloo, Marylebone, Paddington, Charing Cross, and Liverpool Street are all busy terminal stations. The docks must also be considered from a transport standpoint, maintaining as they do a regular communication with all parts of Europe and the world. A unique feature of the Metropolis is the underground railway system, 'The Tube', a high-speed method of point-to-point travelling, with an almost perfect organization for securing speed with comfort. The omnibus system is the main street service, although some parts of the Metropolis are served by electric tramways which travel for a distance, notably between Holborn and the Embankment, under the ground.

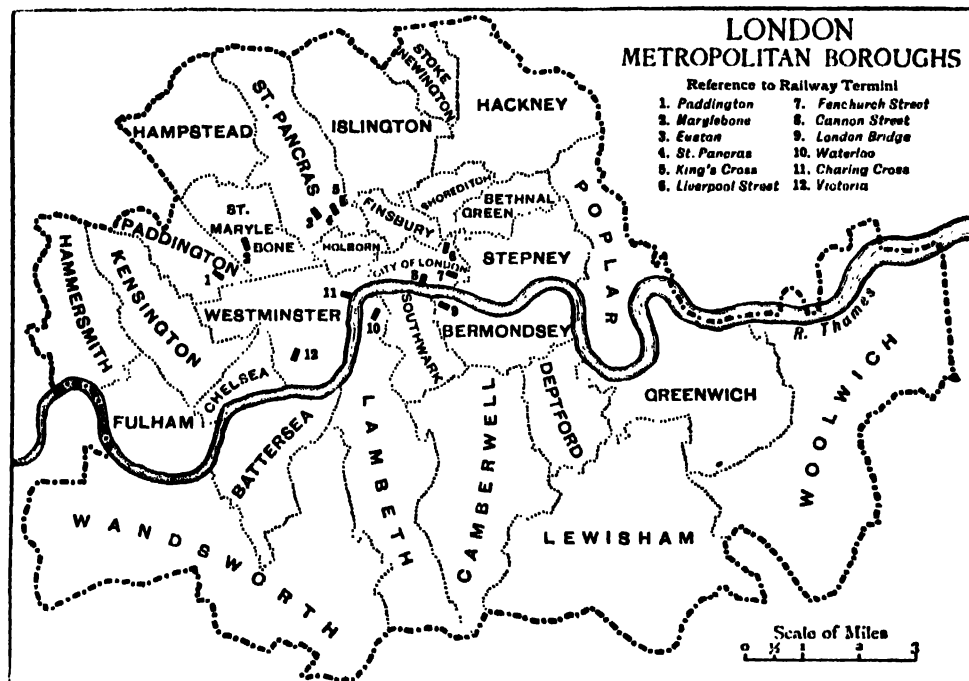
Thoroughfares. The street plan of London is comparatively simple, and may readily be grasped upon a study of the 'trunk lines' of prominent thoroughfares leading from one part of the Metropolis to another. Such a thoroughfare is formed by Trafalgar Square, Strand, Fleet Street, St. Paul's; and by Marble Arch, Oxford Street, Holborn, Holborn Viaduct, Mansion House; or by Euston Road, Pentonville Road, City Road. Many streets are especially connected with specific occupations, i.e. Savile Row is associated with men's tailors, Fleet Street with newspapers, Burlington Arcade with fashionable haberdashers, and Bond Street with jewellers. Pall Mall is the head-quarters of fashionable clubland.

Trade.—London is an extensive trading city, and has also some claim to be considered a manufacturing area. If it is not the headquarters of every leading British firm, every firm of any size in the United Kingdom has its London office or warehouse, and the commercial houses of the world have branches or agencies there. London owes its commercial strength and energy to the regularity with which it draws upon everybody and everything from its own suburbs to the ends of the earth. Many districts, as the streets mentioned elsewhere, are connected with specific industries, e.g. Clerkenwell is the seat of watch-making, Lambeth has potteries, Whitechapel and Stepney are synonymous with tailoring, and matches are made at Bow. Almost every manufacturing industry is followed, but London is primarily a commercial and not a manufacturing city. By far the greatest number

of manufacturers are engaged in cloth-making, and the next departments of manufacture in order of importance are: paper and printing; metals and machinery; woodworking; food, drink, and tobacco; fine instruments; chemicals and drugs; gas and electricity; skins and leather; stone, bricks, and glass.

Markets.—There are nine principal markets in London. (1) Billingsgate, the fish market; (2) Smithfield, the head-quarters of the dead-meat trade; (3) Leadenhall, fish, meat, and poultry;

to control the ports and docks of London and the River Thames from Teddington to the sea. Prior to this date the Thames Conservancy and Dock Companies were absolute. As constituted, the Authority consists of a chairman, vice-chairman, eighteen selected and ten appointed members, while one or two experts may be appointed by the Board of Trade. The Authority absorbed the London and India Docks, Surrey Commercial Docks, Millwall Docks, and the Watermen's Company.



(4) Covent Garden, vegetables, fruit, and flowers; (5) the Metropolitan cattle market, Holloway, for live cattle, sheep, and pigs; (6) the foreign cattle market, Deptford, for the sale of imported cattle; (7) Spitalfields, the East London vegetable market; (8) Stratford, fish, fruit, and vegetable market; and (9) Southwark (the 'Borough') market, which is also for fruit and vegetables.

Port of London.—A most extensive trade is carried on between the Port of London and all parts of the world, and the coasting trade is immense. A long chain of docks extends for miles from the Tower to Millwall, thence to beyond North Woolwich and to Tilbury, but their size and their importance is never immediately noticeable, for they are almost lost to view in the vastness of the crowded Metropolis. The Port of London Authority was created in 1909

Amusements.¹—London is one of the greatest entertainment centres of the world, and is the home of all new plays, the Mecca of stock companies within the British Isles. Nearly all of the theatres are to be found within a limited area, appropriately termed 'Theatreland'. Covent Garden is renowned for grand opera, and Drury Lane is invariably associated with Christmas pantomime and melodrama. There are thirty other theatres and ten music-halls within the city area, and fifty additional music-halls and theatres in the suburbs. Picture-houses include the magnificent London Opera House in Kingsway, the home of modern London architecture. The Royal Albert Hall seats 8000 comfortably; occasional exhibitions are held at Earl's Court

¹ A comprehensive guide to the articles upon places and buildings. &c., will be found in the index.

and at Olympia; the Agricultural Hall, Islington, is the yearly scene of the British Dairy Show; Madame Tussaud's Waxwork contains a collection of all celebrities, notoriety, and some nonentities in wax; and the Crystal Palace contains a war museum.

Sports.—Football is well catered for in London, which has several well-known teams and grounds, e.g.

Tottenham Hotspur (Tottenham).
Woolwich Arsenal (Highbury).
West Ham United (Upton Park).
Fulham (Craven Cottage).
Clapton Orient (Homerton).
Queen's Park Rangers (Park Royal).
Brentford (Griffin Park).
Millwall (New Cross).
Chelsea (Stamford Bridge).
Crystal Palace.

Association football is more popular than Rugby. Lord's, the M.C.C. head-quarters, and Kennington Oval (Surrey C.C.) are famous in the world of cricket. Lawn tennis championships are decided at Wimbledon and at Queen's Club, West Kensington.

Historical.—The modern name London is derived from the Lat. *Londinium*, a Roman corruption of the Brit. *Llyn* or *lin*, a pool, and *din* or *dun*, a stronghold, hill-fort, or city. The 'pool' was an expansion of the river at this point, and is still known by that name. The British or Welsh name for London is *Llundain*, but it was formerly known to the Welsh as *Caerludd* (City of Ludd), who was a British ruler of the pre-Roman period, and is even now commemorated in Ludgate (Lud-gate), a gate of the ancient walled city.

Celtic Britons.—By the evidence of its name, and by the proof of archaeological remains, there can be no doubt that London was occupied by the Celtic Britons prior to the Roman occupation, and that it was a settlement in a clearing of the primeval forest, or a camp on a dry spot in the marshy district which then existed in and around the site of modern London.

Romans.—Following upon the Roman colonization, *Londinium* developed into a place of considerable commercial importance, and there were possibly two settlements of that name, the first destroyed by Boadicea (about A.D. 61) and rebuilt by Theodosius (about 306), the second town being coincident with the medieval walled city. From the Roman *Londinium* great roads radiated, passing through the walls by various gates and reaching the farthest outposts of the Roman colony. The extent of the town may be estimated by following the chain of gates named as under, the nomenclature being preserved in modern London:

Lud-gate.
Dour-gate (Dowgate).
Bilin's-gate (Billingsgate).
Crepel-gate (Cripplegate).
Alders-gate.

Postern-gate.
Old-gate.
Bishop's-gate.
Moor-gate.
New-gate.

Londinium was not the capital of Roman Britain, and was never a *municipium* like *Eboracum* (York) or *Ferulamium* (St. Alban's).

Saxons.—The Roman walls were destroyed by the Danes and restored by King Alfred, the first English king to realize the military importance of the City of London, which, in A.D. 893, became capital of the kingdom. The present sites of Westminster Abbey and St. Paul's were then occupied by churches. London was sacked by the Danes, who obtained a considerable settlement in Southwark, and on the western boundary of the city beyond Ludgate.

Norman Conquest onwards.—At the Conquest London submitted to William and received a charter of freedom, but the city was dominated by a military stronghold, the White Tower of the present Tower of London. The first Lord Mayor was appointed in 1190. London sided with Stephen against Matilda, struggled against John for Magna Charta, strongly supported Edward IV and the Yorkists in the Wars of the Roses, and was faithful to Richard III. It fought for the Parliament against Charles I. Under the late Stewarts and the early Hanoverian dynasty it became more political than municipal, and lost much of its ancient power.

Progress of the City.—In the reign of Henry II the walls on both sides of the river are described in a contemporary account as being furnished with numerous towers. London Bridge, replacing a wooden one, was begun in 1176 and completed in 1209, remaining intact for the most part until its demolition in 1832. In 1218 the forest of Middlesex was cleared, water-pipes were introduced (1230), and coal became known a few years later. London was visited by the plague in 1340 and 1361. Wat Tyler's rebellion broke out in 1381, and Tyler fell at the hands of the Lord Mayor. This combat is commemorated by the dagger on the city arms. Street lanterns were introduced about 1416, some of the main streets were paved, and wood was rapidly replaced by brick in building construction. In the seventeenth century hackney coaches came into general use, but the streets were so narrow and so filthy, and the houses so insanitary, that the city was never entirely free from the plague. The Great Fire of London destroyed upwards of 90 churches and 13,000 houses in 1666, and was a blessing in disguise, for in rebuilding considerable improvements were made in town planning and building construction, so that London became healthier and wealthier than ever. A fire in Southwark ten years later afforded an opportunity of amelioration in that district also. The population and commercial activity increased, partly through the influx of Huguenots after the revocation of the Edict of Nantes. During the eighteenth century the city

steadily progressed. The Gordon Riots took place in 1780, when the mob was in possession of London for two days and worked enormous havoc. One of the most remarkable events of the nineteenth century was the organization of the mammoth exhibition of 1851, the original 'International' exhibition, upon the lines of which all others have since been based. A second one was held in 1862, and the Franco-British, Japan-British, and others were subsequently opened in the White City, Shepherd's Bush. Since that time perhaps the most tremendous events in the history of London may be considered as those leading up to and following upon the declaration of war, 4th Aug., 1914. In the events which followed, London was the objective of all enemy airmen, and suffered severely.

Modern Government.—The government of London, County, City, and Borough, is altogether exceptional, and there is no chief authority for the whole, owing to the historic independence of the Corporation of the City of London. The government is therefore shared by the Common Council of the City, the London County Council, the London Borough Councils, and the special authorities dealing with the poor-law, asylums, education, water, the Rivers Thames and Lee, and the Port.

City Corporation.—The City Corporation is founded on charters which go back to Saxon times. The Mayor, Commonalty, and Citizens or Common Council is the ancient City Corporation, and consists of a Lord Mayor and 25 other Aldermen, with 206 Common Councilmen. The method of election of the Lord Mayor is that the members of the Livery Companies nominate two candidates eligible for office, the final selection resting with the Aldermen. Aldermen are elected for life, for each ward at *wardmote*, and are also the Magistrates for the City.

Borough Councils.—The municipal government of London outside the City is in the hands of 28 Borough Councils, each composed of a Mayor, Aldermen, and Councillors, but they have no educational authority, this being vested in the London County Council.

London County Council.—London County Council is the largest and most important of all the County Councils in the country, comprising 124 elected Councillors and 20 Aldermen (see *Local Government*). It maintains the Metropolitan Fire Brigade, and supervises the Borough Councils, who maintain bridges outside the City and regulate traffic and street names.—**BIBLIOGRAPHY:** H. B. Whentley, *Story of London* and *London Past and Present*; A. St. J. Adcock, *A Short History of London*; L. Hutton, *Literary Landmarks of London*; L. Wagner, *A New Book About London*.

London, a city of Middlesex county, Ontario, Canada, founded in 1825. It is a junction on the Canadian National and Canadian Pacific Railway systems, and is served also by a tramway system terminating at Port Stanley, Erie. London is the centre of a prolific agricultural district, and has a large implement trade. The Western University was established in 1878. Street names are taken from those of the city of London, England. Pop. (1929), 59,100.

London, University of, was originally established as a joint-stock undertaking in 1825. In 1830 two charters were granted, one to London University, with power merely to examine and grant degrees, another to a teaching body occupying the original premises in Gower Street, which took the name of University College. Supplementary charters were granted in 1858, 1863, and 1878, the last admitting women to all degrees and prizes. The university itself still continued to confer degrees simply, but by an Act passed in 1898 provision was made for its reconstruction, whereby it should become both a teaching and an examining body; and in accordance with regulations, coming in force in 1900, the university embraces a number of institutions, in which students receive instruction in all branches of knowledge. These include University College, King's College, and a number of metropolitan institutions, medical, theological, scientific, &c.; the faculties of the university are theology, arts, science, engineering, political science (including commerce and industry), economics, engineering, law, music, and medicine. The university still continues to confer degrees on all comers after examination, admitting as a candidate any person who is above sixteen years of age. Provincial examinations are carried on simultaneously with the London ones. The university of London returns one representative to Parliament. Its head-quarters are meantime in the Imperial Institute, South Kensington. A Royal Commission was appointed in 1909 for the purpose of inquiry into university education, and recommended important changes (1913). In May, 1920, the Government offered a new site in Bloomsbury for the building of a new university.

London Clay, the most important of the Eocene tertiary formations of Great Britain, largely developed in the valley of the Thames under and around the Metropolis. This formation consists of a bluish or brownish clay containing layers of argillaceous nodular limestone. The fossil shells, fruits, &c., found in the London Clay mostly belong to genera now inhabiting warmer seas and shores than those of Britain.

Londonderry, Robert Stewart, second Mar-

quess of, British statesman prominent as Viscount Castlereagh, was born in 1769, and committed suicide when of unsound mind in 1822. In 1814 he was a member of the Congress of Vienna and became very unpopular through his support of the Holy Alliance.

Londonderry, a city and seaport of Ulster, and capital of County Londonderry, on the River Foyle. The city stands partly on a hill crowned with the Protestant cathedral of St. Columba (1653), and still retains its seventeenth-century walls, though the buildings now stretch far beyond them. There is a modern Roman Catholic cathedral. Magee College has courses in arts and theology, the latter specially adapted for Presbyterian students. The harbour is commodious, and an extensive trade is carried on. Linen is manufactured, and there are shirt-factories, timber-mills, grain-mills, foundries, and distilleries, &c. Derry originated in a monastic establishment erected by Columba in 546. The Corporation of London, who obtained a grant of the town from James I, fortified it, and gave it the name of Londonderry. Here the Protestants of Ulster took refuge at the Revolution, and made a famous defence against the forces of James II, the siege lasting from the 18th April till the 30th July, 1689.

Londonderry, a maritime county of Ulster; area, 522,315 acres. It consists partly of wild and bleak tracts of mountain and moor, partly of flat alluvial lands. The principal rivers are the Foyle, the Faughan, the Roe, the Bann, and the Moyola. The fisheries are important. The staple manufacture is linen. Londonderry is the chief town, and Coleraine next in size. A great part of the county formerly belonged to the Irish Society and the Mercers' Company (London), having been granted to the Common Council of London and the Livery Companies by James I in 1609, after the flight of the Earls of Tyrone and O'Donnell, but has now been sold. Pop. 140,000.—Cf. J. W. Kernahan, *The County of Londonderry in Three Centuries*.

London-pride (*Saxifraga umbrosa*), a perennial evergreen plant of the Saxifrage order. It has flower-stems 6 to 12 inches high, with small spotted pink flowers. It thrives in the smokiest towns.

Long, Loch, an arm of the Firth of Clyde separating Dumbarton from Argyll. The North British Railway serves the east side to Portincapple, and Arrochar at the head of the loch. At Ardentinnay Loch Goll branches to the left, passing the ancient Carrick Castle and extending to Lochgollhead, where Glasgow owns a large mountainous estate (Ardgoll).

Long Branch, a watering-place of Monmouth county, New Jersey, United States. The permanent population is about 10,000, but

during is frequently increased by 30,000.

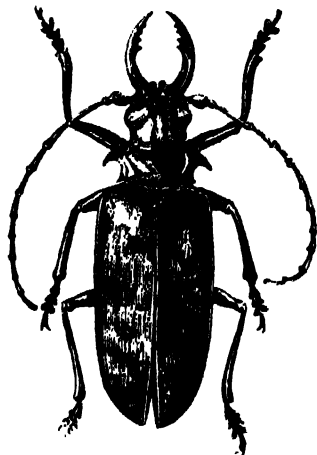
Long Eaton, an urban district and town of Derbyshire, on the Midland Railway. Its manufactures are lace-making and railway-carriage building. Pop. (1921), 19,503.

Longfellow, Henry Wadsworth, American poet, was born 1807, died 1882. He was educated at Bowdoin College, and distinguished himself there in the study of modern languages, publishing some short poems, including the *Hymn to the Moravian Nuns*. In 1826 he accepted the professorship of modern languages at Bowdoin, being allowed three years to prepare himself for the post by study and travel in Europe. In the year 1835 he was appointed to the chair of modern languages at Harvard, and, after spending another year in the study of Scandinavian languages and literature, he entered on his professorship (1836), retaining it until 1854, when he resigned. During this period all his most important poems appeared, quite devoid of Americanism in thought or expression, and gained for Longfellow the approbation of Europe in addition to his American popularity. In 1868 he again travelled in Europe, receiving honorary degrees from Cambridge and Oxford.—BIOGRAPHY: Samuel Longfellow, *Life of Henry Wadsworth Longfellow*; P. Morin, *Les Sources de l'Œuvre de Henry Wadsworth Longfellow*; M. Stevenson, *The Spiritual Teaching of Longfellow*.

Longford, an inland agricultural county of Leinster; area, 257,770 acres, exclusive of water. The county is watered by the Shannon and Inny, and is connected with Dublin by means of the Royal Canal. The Shannon, falling into Lough Ree, provides an inland waterway to Limerick, and the Midland and Great Western Railway from Dublin, via Mullingar, traverses the county. The flat countryside is studded with peat-bogs, especially around Lough Ree, but generally stock-raising and dairy-farming and, in the south, cereal and green forage cropping are practicable and widely practised. The chief town is Longford. Longford county was originally a part of Meath and afterwards of Westmeath, and emerged as a county in 1560. It was occupied by the English in the reign of Henry II. Pop. about 45,000.—*Longford*, the county town, stands on the Camlin, and is the seat of the Bishop of Ardagh. It has an extensive trade in dairy and general agricultural produce. Pop. about 4000.

Longicorn Beetles (Cerambycidae), a family of Coleoptera, including a vast number of large and beautiful beetles, all remarkable for the length of their antennae, which, in the males of some of the species, are several times longer than their bodies. The females deposit their eggs

beneath the bark of trees by means of a long, tubular, horny ovipositor, and the larvæ are very destructive to wood.



Longicorn Beetle (*Acanthophorus serraticornis*)

Longinus, Dionysius Cassius, Greek rhetorician and philosopher, born at Athens or Emesa (a disputed point) about A.D. 213, and executed by the Emperor Aurelian A.D. 273. He taught criticism, rhetoric, and grammar at Athens, visited the East, and became counsellor to Zenobia, Queen of Palmyra, whom he encouraged in an unsuccessful revolt against Rome. Only fragments of his works are extant, and the treatise *On Impressiveness of Style* (*Peri Hypsoûs*), long ascribed to Longinus, is now supposed to belong to the first century A.D.—Cf. G. E. B. Saintsbury, *History of Criticism and Literary Taste in Europe*.

Longirostres (Lat. *longus*, long, and *rostrum*, a beak), a group of birds characterized by the possession of long, slender, soft bills, mostly frequenting marshy districts, moors, fens, &c. This group, more commonly termed Limicole, comprises the snipes, woodcock, sandpipers, curlews, ruff, godwit, turnstone, avocet, &c.

Long Island, an island of New York, United States; area, 1682 sq. miles. It is divided into four counties, King's, Queen's, Suffolk, and Nassau, and is extensively wooded. In 1776, during the War of Independence, the British defeated the Americans in the battle of Long Island. Long Island is a great residential area for business men of New York City, the western part being actually a part of the city, and separated from the mainland by the East River, at this point only half a mile wide. Coney Island is at the south-west extremity; Rockaway Beach is a watering-place, and Sheephead Bay Race-course is well known. There are also flying-

grounds, motor-racing courses, golf-courses, and rifle-ranges of importance. Pop. about 2,500,000.

Long Island City, a part of New York City, Queen's Borough, Long Island, separated from Brooklyn by Newtown Creek. It was settled by the Dutch in 1640, and became a city in 1870, merging with New York in 1898. It has a frontage of some 10 miles to East River.—Cf. S. van Rensselaer, *History of the City of New York*.

Long Island Sound, a broad arm of the sea separating Long Island from Connecticut and New York, 110 miles long, and connected with New York Bay by East River (q.v.) and Hell Gate.

Longitude, in geography, the distance of a place east or west from a meridian taken as a standard or prime meridian, this distance being measured along the equator or a parallel of latitude; in other words, it is the angle between the meridian plane of a place and the prime meridian plane. Longitudes are now generally reckoned from the meridian of Greenwich (see *Meridian*). Since the parallels of latitude get smaller towards the poles, at which all the meridians converge, it is evident that degrees of longitude, which are 69½ statute miles long at the equator, get shorter towards the poles, at which they finally become zero, as will be understood from the accompanying cut. As the earth makes one revolution on its axis, that is, turns through 360° of longitude from west to east, in twenty-four hours, if the sun or a star is on the meridian of any place at a particular time, it will be on the meridian of another place 15° west of the first in one hour. Thus 15° of longitude re-



present one hour of difference in time, and hence longitude may be easily determined by comparison of the local time with the indication of a chronometer set to Greenwich time, which is the method commonly employed at sea. Longitude is reckoned to 180° eastward or westward of the fixed meridian (see *Day*). The latitude and longi-

tude of a place enable us to fix its exact position on a map or globe.

• **Long Parliament**, the name commonly applied to the fifth and last Parliament of Charles I, which succeeded the 'Short Parliament', and met 3rd Nov., 1640. Among its early acts were the impeachments of Laud and Strafford and the abolition of the Star Chamber. In 1647 Charles was delivered up to the Parliament, and in Dec., 1648, 'Pride's Purge' excluded from the Commons ninety-six members who were obnoxious to the army; the remainder were henceforth known as the 'Rump'. The king's trial and execution took place in Jan., 1649, and in the following May the Commonwealth was proclaimed. The 'Long Parliament' finally decreed its own dissolution on 16th March, 1660, thus having lasted for twenty years.

Longus, a Greek novelist, probably of the third century. He is the author of the pastoral romance of *Daphnis and Chloe*. This work enjoyed a great vogue at the time of the Renaissance.—Cf. Joseph Jacobs, *Daphnis and Chloe*.

Longwy (lon-vi), a town of Meurthe-et-Moselle, France, near the Belgian frontier, and before the European War a fortress of the second class. It was called by Louis XIV 'the iron gate of France'. In 1870 it capitulated to the Germans after a severe bombardment. In Aug., 1914, the town was again surrendered to the Germans. Pop. about 9,000.

Lons-le-Saulnier (lon-lé-sô-nyâ), a town, capital of the department of Jura, France, and the birth-place of Rouget de l'Isle, author of the *Marseillaise*. It is a railway junction, and has a trade in salt and wine. Near by are Montmorot brine springs. Pop. about 13,000.

• **Loo** (formerly called *lunterloo*), a card game for two or more persons, each of whom has three cards dealt, while an extra hand, called 'miss', is also dealt. A trump card is then turned up, and each player, after having declared whether he will play, take miss, or throw up his hand, plays one card in order, tricks being taken as in whist. The winners of the tricks divide the pool between them proportionately, each player having previously contributed to the pool, and the dealer having put in double. The game is still played, but was extremely popular in the early eighteenth century.

Loo-Choo, Lew-Chew, or Liu-Kiu, a Pacific island chain. See *Ryu-Kyu*.

Lopez, Francisco Solano, President of Paraguay, born at Asunción in 1827, and killed in 1870. His early education was neglected during the dictatorship of Francia. In his eighteenth year his father made him a brigadier-general in the war against Rosas, the dictator of Buenos Ayres, but he took no actual part in the struggle. He afterwards filled some of the principal offices of

State, and was sent to Europe in 1853, accredited to the chief courts there. In 1855 he returned to Paraguay, became Minister of War, and on the death of his father, in 1862, President for ten years. He had long been aiming at the foundation of a great inland empire, and as his military preparations were now complete, and his army superior to that of any of the Latin-American states, he declared war against Brazil in 1864. The Argentine Republic and Uruguay allied themselves with Brazil, and after five years' conflict Lopez, reduced to extremities, was finally surprised on the banks of the Aquidaban by a troop of Brazilian cavalry and killed.

Lophobranchii, the group of Teleostean fishes including the peculiar 'Sea-horses' and the 'Pipe-fishes'. See *Pipe-fishes*; *Hippocampus*.

Lophodermium, a genus of Ascomycetous Fungi, group Discomycetes. Several are harmful parasites, notably *L. pinastri*, which causes the 'needle-cast' of Scots pine and other species of Pinus.

Loquat (*Eriobotrya japonica*), a Japanese fruit tree of the nat. ord. Rosaceæ, and closely allied to the medlars. The fruit is about the size of a large gooseberry, of a fine yellow colour. The tree is a beautiful evergreen, whose white flowers have a fragrance like that of hawthorn blossom. It attains a height of from 20 to 30 feet, but when cultivated it is not allowed to exceed 12 feet. It thrives well in Australia and is often reared in hot-houses in Britain.

Loranthaceæ, a natural order of woody apetalous dicotyledons, of which the mistletoe is the type, the perianth being often brilliantly coloured, all in one piece, or formed of many sepals. They are practically all half-parasites on various trees and shrubs.

Lorca, a town of Murcia, Southern Spain, comprising an old Moorish town on a slope crowned by a castle, and a lower modern town. It is in a silver- and lead-mining district. The cathedral dates from the twelfth century. Pop. 70,807.

Lord (O.-Eng. *hlaford*, for *hlāfweard*, that is, bread-keeper), a title of honour or dignity, used in different senses. In feudal times a lord was the grantor or proprietor of land, who retained the dominium or ultimate property of the land or fee, the use only being granted to the tenant. A person who has the fee of a manor, and consequently the homage of his tenants, is called the *lord of the manor*. Loosely all who are noble by birth or creation, excepting dukes and princes, may be called *lords*. The *lords temporal*, in contradistinction to the *lords spiritual* (the Archbishops of Canterbury and York, and twenty-four bishops), are the peers who sit together in the House of Lords. Lord is sometimes only an official title, as *lord advocate*, *lord mayor*, &c.

Certain officials, as those of the Treasury and the Admiralty, are collectively called lords in virtue of their office, but are not so addressed personally. The title is also applied, but only by courtesy, to the sons of dukes and marquesses, and to the eldest sons of earls. (See *Address, Forms of.*) In Scotland the judges of the Court of Session prefix the title 'lord' to their surname, or to some territorial designation assumed by themselves. Judges, when on the bench, are addressed as 'My lord' throughout the three kingdoms.

Lord Howe Islands, the alternative name of the Ontong Java group, Solomon Islands (British).—*Lord Howe Island*, a dependency of New South Wales, Australia, lies 500 miles north-east of Sydney; area, 3220 acres. A Board of Control at Sydney manages the island affairs and controls the palm-seed industry. Pop. about 100.

Lord's Prayer, a formula of prayer enunciated by Christ on two different occasions, for which see *Matt.* vi, 5-13; *Luke* xi, 1-4. It is known in the older Catholic Churches by its opening words, *Pater Noster*. Among the earliest Christians it was accepted as the standard form of prayer, and its use in the liturgy is frequently mentioned by the early Fathers. The concluding clause of the prayer, known as the doxology, "For Thine is the kingdom", &c., is not found in St. Luke's gospel, and even in that of St. Matthew it is only found in some of the later manuscripts, in which it is generally held to be an interpolation. It is retained by Protestants, but is discarded by Roman Catholics.

Lord's Supper, one of the sacraments of the Christian religion: so named because it was instituted by Christ when He took His last meal with His disciples, on the occasion of celebrating the Passover. It has also the names of eucharist and communion, and among the Catholics that of the Mass or sacrifice of the Mass. It has undoubtedly been celebrated, with certain differences, since its institution, and is still celebrated by all sects of Christians except the Quakers. The chief controversies regarding the nature of the rite rest chiefly on the question of the 'real presence' of Christ's body and blood and the doctrine of transubstantiation. The doctrine of transubstantiation, promulgated by Paschasius Radbertus in the ninth century, was generally received, and officially approved by the Council of Rome in 1079. It was solemnly confirmed in 1215 by the fourth Lateran Council. According to this doctrine, the whole substance of the bread and wine is changed into the body and blood of Christ, only the appearance of bread and wine remaining; and the Roman Catholic Church further maintains that Christ is given wholly and entirely both under the form

of the bread and under that of the wine. From the doctrine of transubstantiation sprang the adoration of the host (or sacred bread), as well as the custom of refusing the cup in the communion to the laity and non-officiating priests, a practice first authoritatively sanctioned at the Council of Constance, 1415. At the Reformation both the German and Swiss reformers agreed in rejecting the doctrine of transubstantiation and the Mass, and maintaining that the Lord's Supper ought to be celebrated before the whole congregation, and with the administration of both bread and wine. In explaining the words by which the supper was instituted Luther and Zuinglius differed, and their different opinions on this subject formed the principal subject of dissension between the Lutheran and Calvinistic Churches. Luther took the words "This is my body", &c., in their literal sense, and thought that the body and blood of Jesus Christ are united, in a mysterious way, with the bread and wine, which, however, remain unchanged, so that the communicant receives, in, with, and under the bread and wine, the real body and blood of the Redeemer. Zuinglius, on the other side, understood the words in a figurative sense, and maintained that the Lord's Supper was a mere commemoration of the death of Christ, and a profession of belonging to his Church. This view is in substance adopted by the Socinians, Arminians, and some others. The opinion advanced by Calvin, by which a spiritual presence of the body and blood of Christ is supposed in the communion, by partaking of which the faithful receiver is brought into union with Christ, through the medium of the Holy Ghost, though it came nearer to the Lutheran doctrine than that of Zuinglius did, yet was essentially different. The Greek Church is not adopted the entire doctrine of transubstantiation; yet her doctrine, which was defined and sanctioned by the Synod of Jerusalem in 1672, comes nearer to this dogma than to that of the Reformed Church. The Anglican Confessions incline more to the view of Zuinglius. The 28th Article of the Church of England declares that "the body of Christ is given, taken, and eaten in the supper only after an heavenly and spiritual manner". The doctrine adopted by the Presbyterian Church of Scotland in the main agrees with that propounded by Calvin. — BIBLIOGRAPHY: R. J. Wilberforce, *Doctrine of the Holy Eucharist*; J. D. Dalgairns, *The Holy Communion: its History, Philosophy, and Practice*; G. A. Jacob, *The Lord's Supper Historically Considered*; R. M. Adamson, *Christian Doctrine of the Lord's Supper*.

Lorelei (lô're-lî), a precipitous cliff on the Rhine, about 450 feet high, half a mile above St. Goar. It is the traditional abode of a siren, who by her singing enticed boatmen to destruction.

The legend is a favourite with German poets, and has been treated by Heine. The rock is pierced by a railway tunnel.

Loréto, an interior department and the largest of Peru, in the north-east, fronting the boundaries of Brazil, Colombia, and Ecuador. The exports are rubber, salt, and gold. Area, 288,456 sq. miles; pop., 100,500 (mainly Indians). Iquitos, on the Marañon, is the capital.

Loret'to, or **Lore'to**, a city of Ancona, Italy, 3 miles from the Adriatic. Pop. 7000. The *Casa Santa* or Holy House of Loretto, which is said to have been the house of the Holy Family at Nazareth, and to have been miraculously conveyed by the angels first to Fiume in Dalmatia, and afterwards to Loretto, is an important place of Roman Catholic pilgrimage. This Holy House, in the centre of a church built by Majano and Bramante (1464-1587), and covered externally with white marble, is 30 ft. long, 15 feet wide, and 15 feet high. It was partially destroyed by fire on 22nd Feb. 1921.

Lorient, a seaport and arsenal of Morbihan, France, on the Brittany coast. In 1670 the town became a station of the East India Company (Fleury), and it made a naval station on the dissolution of the company in 1771. Its name (*Orient*) is derived from this occupation. Lorient is now a prominent naval base with armouries, magazines, and shipbuilding, but has also some trade, especially in coal and wines. Pop. about 50,030.

Lor'ikeet, the general name of certain small Australian parrots, including the genera *Loriculus*, *Charmosyna*, and *Cerylephus*.

Loris, the name of two small Oriental lemurs, the slow loris (*Arctocebus tardigradus*), ranging from Assam to the Philippines, and the slender loris (*L. gracilis*), native to Southern India and Ceylon. They are not much larger than rats, and are nocturnal and arboreal in their habits. Many superstitions are associated with the slow loris.

Lorraine (Ger. *Lothringen*; ancient *Lotharingia*), a territory so named as being the kingdom of Lothaire I (q.v.). Lower Lorraine, between the Rhine, Meuse, and Scheldt, became the Duchy of Brabant, and Upper Lorraine was for long an independent duchy with Nancy as capital. In 1766 it passed to France. At the conclusion of the Franco-Prussian War of 1870-1 a considerable portion of Lorraine was annexed to Germany, but together with Alsace it reverted to France by the Treaty of Versailles, and is now the department of Moselle (see *Alsace-Lorraine*). It is rich in coal and iron, and is traversed by the Moselle and Saar. Area, 2403 sq. miles; pop. 655,200.—BIBLIOGRAPHY: G. W. Edwards, *Alsace-Lorraine*; R. Putnam, *Alsace and Lorraine*; R. Parisot, *Histoire de Lorraine* (vol. i—to 1552).

Lory, a kind of parrot having a broad tail and dense soft plumage, the colours of which are extremely brilliant. Lories are natives of the Australian region. There are several species of the type-genus *Lorius*, as the purple-capped or collared lory (*Lorius domicellus*), cream lory (*L. garrulus*), and scarlet lory (*L. cerruleatus*). The collared lory is the most highly valued, and is easily taught to speak, having imitative and ventriloquial powers of the most remarkable order. The general plumage is scarlet, the wings green. There are several other genera, and in South Africa the name lory is given to a plantain eater (*Turacus corythaix*).

Los Angeles (lŏs an'je-lēs), a city, and capital of Los Angeles county, California. It stands on Los Angeles River, and is the centre of the American cinema industry. One of the most beautiful cities of America, Los Angeles is a favourite health-resort. There is much fruit growing in the vicinity, and elaborate irrigation to foster the industry. Los Angeles was settled by the Spaniards as Pueblo de Nuestra Señora la Reina de los Angeles in 1781, was captured by the United States in 1847, and became a city in 1851. Pop. (1920), 576,673.

Lost Property. If any person finds an article, it does not belong to him but to the loser, and if the loser can identify his property, he has a right to restitution; a third party purchasing lost property from the finder must restore it to the owner if called upon. The finder is not obliged to incur expense in advertising for the owner. The act of taking lost property to a local police office, and of obtaining a receipt therefor, entitles the finder to absolute power of disposal over such property when a reasonable time has been allowed for its recovery.

Lost Tribes, The. The return of the tribes of Judah carried captive into Babylon in 527 B.C. is recorded in sacred history; but concerning the ultimate fate of the tribes expatriated by Tiglath-pileser in the time of the Jewish king Pekah (2 Kings, xv, 20), and of those exiled after the later fall of Samaria (2 Kings, xvii, 6), who were carried into Assyria, history is silent, and the fate of these 'lost tribes' and the identity of their descendants has long been a matter of curious and, for the most part, extremely fanciful speculation. The Anglo-Israelite theory, which would identify the missing tribes with the Anglo-Saxon race, has found many supporters, but possesses little or no solid grounds for serious consideration. Other inquirers claim to have discovered the 'lost tribes' in the North American Indians, in the Laplanders, or in the primitive inhabitants of Mexico, this last theory finding an enthusiastic partisan in Lord Kingsborough. William Whiston was inclined to view with favour the belief which

traced the Tartars to a Jewish source. Perhaps the least improbable theory is that by which the missing tribes have been identified with the Afghans, a people presenting many interesting points of likeness to the Jewish race; but the surmise is, in spite of something to support it, one to be regarded with caution. There is a fairly extensive literature which treats of the subject of the missing tribes.

Lot (lot), an inland department of South-West France; area, 2017 sq. miles. It is traversed by the Dordogne in the north, but lies mainly in the valley of the Lot, one of the largest tributaries of the Garonne. It has a course of some 250 miles. In the department there are extensive vineyards, and the soil, &c., makes it suitable for dairying and stock-breeding. The capital is Cahors (q.v.). Pop. (1921), 170,889.

Lot-et-Garonne (lot-e-gà-ron), an inland department of South-West France; area, 2078 sq. miles. It is intersected by the Garonne and its tributary the Lot. In the valleys there are many vineyards; throughout the province cereals are raised, with some tobacco and hemp. The department comprises parts of pre-Revolutionary Guienne and Gascony. The capital is Agen (q.v.). Pop. (1921), 239,972.

Lothaire I, Emperor of the Holy Roman Empire, born A.D. 795, died 855. He gave his name to Lorraine (Lotharingia).

Lothaire II, called the *Saxon*, Emperor of the Holy Roman Empire (q.v.), born about 1000, died 1137.—Cf. Viscount Bryce, *Holy Roman Empire*.

Loti, Pierre, pen-name of Louis Marie Julien Viaud, French novelist and naval officer, born at Rochefort 14th Jan., 1850. He entered the marine service in 1867, served with distinction throughout the Tongking campaign, and retired from the navy in 1898 with the rank of lieutenant. Loti's works are a revival of the spirit of romanticism in French literature, and thus the very antithesis of those of the realistic school. Full of intense passion but also of universal pity and resignation, they arouse a feeling of melancholy in the reader. The impression one receives in reading Loti's novels is that the author, despising all excess of culture, is invariably attracted by the primitive, either in character, race, or civilization. Landscape always plays an important part in Loti's novels, and his description is so vivid that the country where his scene is laid always assumes an individuality of its own. His first novel *Aziyadé* appeared in 1876. *Rarahu*, a Polynesian idyl, afterwards re-published as *Le Mariage de Loti*, appeared in 1880. Other works from his pen include: *Le Roman d'un Spahi* (1881), *Mon Frère Yves* (1883), *Pêcheur d'Islande* (1886), *Madame Chrysanthème* (1887), *Le Désert* (1895), *Ramun-*

tcho (1897), *La Galilée* (1898), *L'Inde (sans les Anglais)* (1903), *Les Désenchantées* (1906), and *La Mort de Philéas* (1908). He was elected to the Académie Française in 1891. He died in 1923.—Cf. H. Bordeaux, *Quelques Portraits d'Hommes*.

Lotoph'agi (Gr. *lotos*, *lotus*, and *phagein*, to eat), or lotus-eaters, in Greek mythology, the name of a people inhabiting a portion of Cyrenaica in Northern Africa, who lived on the fruit* of the lotus tree. According to Homer, they received Odysseus and his followers hospitably, but the sweetness of the fruit (*lotos*) induced such a feeling of happy languor that they ceased to desire to return to their native land. See *Lotus*.

Lot'tery, a scheme for the distribution of prizes by chance, the plan being generally to have a certain number of prizes and a much greater number of tickets, the prizes being allotted according as the drawing of numbered tickets from a suitable receptacle shall decide. Lotteries on a large scale originated in Italy, from which they passed into France. In England the first public lottery occurred in 1500, the proceeds being devoted to public works. The rage for private, and, in many instances, most fraudulent lotteries, was at its height in England in 1700, and towards the close of the year an existing Act of Parliament was enforced for the suppression of such lotteries as public nuisances. Government lotteries still continued, however; but in 1826 lotteries were abolished in Britain, except in the case of art-unions, which are permitted from their supposed good effects in encouraging art. In France the demoralizing influence of lotteries caused their suppression in 1836. They are still exceptionally permitted, and State Lottery Bonds are issued, prizes being awarded to those whose Bond numbers are drawn at stated periods. Lotteries for merchandise of all kinds, from estates to pictures, are common in Germany; and in Italy and Austria the Governments draw an important part of the revenue from their management of money lotteries. In most of the United States lotteries, formerly very commonly resorted to as a means of assisting colleges or benevolent institutions, have been abolished, or at least require a special authorization from the legislature. In Britain sweepstakes and raffles are lotteries. So are 'missing-word' competitions, where there are several equally suitable solutions, and such-like competitions in which money is risked or gained by chance. Even an agreement to share the profits of an adventure by lot constitutes a lottery; but it is not illegal for benefits in a mutual benefit society to be allotted to the members in turn by periodical drawings.—Cf. J. Ashton, *History of English Lotteries*.

Lotus, a name applied to a number of different plants, from the lotus famous in Greek legend,

One of these is the *Zizyphus Lotus*, a native of Northern Africa and Southern Europe, belonging to the nat. ord. Rhamnaceæ. It is a shrub 2 or 3 feet high, bearing a fruit, the jujube, which is a drupe of the size of a wild plum. Some think this was the food of the Lotophagi, though others



Lotus (*Nymphaea Lotus*)

consider Homer's lotus to have been the date, or the berry of the *Rhamnus Lotus*, or that of the *Nitraria tridentata*, still greatly prized by the Berbers. The name lotus was also given to several species of water-lily, as the blue water-lily (*Nymphaea cœrulea*), the Egyptian water-lily (*N. Lotus*), and to the nelumbo (*Nelumbium speciosum*), which grow in stagnant or slowly running waters. *Nymphaea cœrulea* and *N. Lotus* are often found figured on Egyptian buildings, columns, &c., and the nelumbo, or Hindu and

Chinese lotus, plays a prominent part in the mythology of these countries. The Hindu deities are often represented seated on a throne of the expanded lotus flower. Among the Chinese the lotus was connected with Fuh, or Buddha, and symbolized female beauty. The name is also given to a genus of plants, nat. ord. Leguminosæ, consisting of creeping herbs and undershrubs, chiefly natives of temperate regions throughout the world. Four or five species are found in Britain, where they are known as bird's-foot trefoil.

Loubet, Émile, French statesman, seventh President of the French Republic, born at Marianne, department of Drôme, on 31st Dec., 1838. He studied law in Paris, and in 1876 entered the Chamber of Deputies, where he joined the Radical Left, or the Radical Republican group. He was Minister of Public Works in 1887, and in 1892 became Premier in succession to M. de Freycinet. President of the Senate in 1896, and again in 1898, he succeeded Félix Faure as President of the Republic in Feb., 1899. He was a man of strong democratic tendencies, and during his tenure of office a strong anti-clerical policy was inaugurated, culminating in the separation of Church and State in 1905. He was strongly in favour of a revision of the Dreyfus case.

Loughborough, a municipal borough and town of Leicestershire, on the Soar, with large engineering works, hosiery manufactures, a bell-foundry, and dye-works. There is a college with departments of science, art, and engineering. Pop. (1921), 25,874.

Louis (Ger. *Ludwig*; q.v.), the name of eighteen kings of France descended from Louis I, King of the Franks and also German king. See *France*; *Germany*; *Ludwig*; *Holy Roman Empire*.—**BIBLIOGRAPHY**: J. de Joinville, *Saint*

Reigned.	Born.	Died.		Succeeded by.
Louis I (814-840)	778	840	Third son of Charlemagne	Lothaire I.
Louis II (877-879)	846	879	Son of Charles the Bald	Louis the Blind.
Louis III (879-882)	863	882	" Louis II	Charles III.
Louis IV (936-954)	921	954	" Charles III	Lothaire II.
Louis V (986-987)	966	987	" Lothaire	Hugh Capet.
Louis VI (1108-1137)	1078	1137	" Philip I	Louis VII.
Louis VII (1137-1180)	1120	1180	" Louis VI	Philip Augustus.
Louis VIII (1223-1226)	1187	1226	" Philip Augustus	Saint Louis.
Louis IX (1226-1270)	1214	1270	" Louis VIII	Philip III.
Louis X (1314-1316)	1289	1316	" Philip IV	John I.
Louis XI (1461-1483)	1423	1483	" Charles VII	Charles VIII.
Louis XII (1498-1515)	1462	1515	" Charles, duc d'Orléans, grandson of Charles V	Francis I.
Louis XIII (1610-1643)	1601	1643	" Henry IV	Louis the Great.
Louis XIV (1643-1715)	1638	1715	" Louis XIII	Louis XV.
Louis XV (1715-1774)	1710	1774	Great-grandson of Louis XIV	Louis XVI.
Louis XVI (1774-1793)	1754	1793	Grandson of Louis XV (guillotined)	
Louis XVII	1785	1795	Second son of Louis XVI (titular king, 1793-5)	
Louis XVIII (1814-1824)	1755	1824	Grandson of Louis XV; brother of Louis XVI	Charles X.

Louis; C. Hare, *Life of Louis XI*; Sir Walter Scott, *Quentin Durward*; A. Dumas (père), *Mes Mémoires* (vol. i), *Taking the Bastille, Comtesse de Charny*; A. C. S. Haggard, *Louis XVI and Marie Antoinette*; F. G. Lenôtre, *The Riddle of the Temple Prison* (Louis XVII); M. F. Sandars, *Louis XVIII*.

Louis, the German, born about A.D. 800, died 876, youngest son of Louis I, grandson of Charlemagne. He divided with Charles the Bald the dominions of Lothaire I, their nephew.

Louisburg, a seaport of Cape Breton, Nova Scotia, Canada. It was strongly fortified under the French; but was taken by the British in 1745 and by Boscawen and General Amherst in 1758, the island being ceded to them in 1763. There is a fine harbour and important fisheries. Pop. 1000.

Louis d'Or (lô-ê dor), or simply **Louis**, a gold coin of France, first struck in 1640 by Louis XIII, in circulation until 1810. The inscription, *Christus regnat, vincit, imperat*, was superseded in 1792 by *Règne de la loi*. It ranged in value from about 10s. 7d. to 18s. 9½d. sterling. In 1810 the louis d'or was replaced by the napoleon of 20 francs, or 15s. 10d. sterling, and when the coin was again struck under the Restoration the same value (20 francs) was retained.

Louisiade Archipelago, an island group of Oceania, in the Australian Commonwealth territory of Papua (formerly British New Guinea). It was discovered by Torres (1606), and annexed to Britain in 1888, subsequently passing to Australia (1901). The inhabitants are of Melanesian and Papuan extraction, and the majority are of peaceful habits. Alluvial gold is found.

Louisiana (lô-iz-i-an'û), one of the Southern United States of America, on the shores of the Gulf of Mexico. It has an area of 48,500 sq. miles. The coast, extending for 1250 miles, is a low swampy region lying around the Mississippi delta, but producing large quantities of rice and sugar-cane; towards the north and north-west the highest elevation is reached. The chief rivers are the Mississippi, which runs for about 600 miles along the border of and through the state; the Red River, which crosses the state diagonally and forms an important inland water-way; the Washita, Saffine, and Pearl, all navigable. There are also numerous 'bayous' or secondary outlets of the rivers of much importance for both navigation and drainage purposes. The climate is semi-tropical, and the rainfall heavy along the coast. The leading industry is agriculture, the main crops being corn, rice, and cotton, with some oats, potatoes, and tobacco. Dairying is also practised to a limited extent, and there is extensive lumbering. There are sulphur-mines and salt deposits; valu-

able fisheries and oyster-beds extend along the coast. The Mississippi and other rivers afford exceptional inland water-ways; the railways are extensive, mainly on the lines of the Illinois Central, Louisville and Nashville, Texas and Pacific, and Southern Pacific systems. There is also a limited mileage of electric track. Baton Rouge is the state capital, and contains the state university (founded 1800), and the Agricultural and Mechanical College (opened 1874). New Orleans is by far the largest town, and is the state seaport. It contains the Roman Catholic University of Loyola, founded 1904. The New Orleans University (founded 1847) is for coloured persons. 60 per cent of the population of Louisiana are of the Roman Catholic faith. Louisiana was annexed to France by La Salle in 1682. He named it after Louis XIV, and the district was colonized by the French in 1699. In 1717 it was ceded to a chartered company promoted by the notorious Law; resumed in 1720 by the Crown; ceded to Spain (1763); and re-ceded to France again in 1800. In 1803 the United States purchased Louisiana from France, and it was admitted into the Union in 1812. Pop. (1920), 1,797,708.—Cf. A. Phelps, *Louisiana* (in American Commonwealth Series).

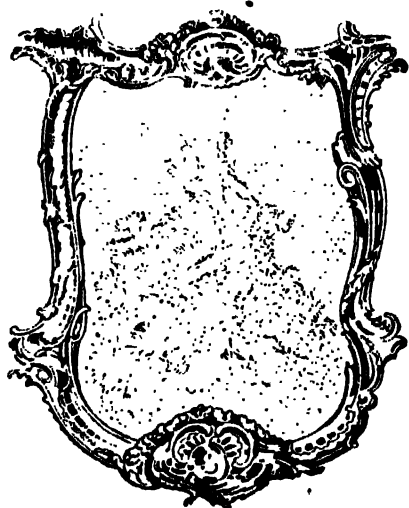
Louis Philippe, King of the French, born at Paris, 1773, died at Claremont, England, 1850. He was the eldest son of Philippe Egalité (see *Orléans*), and during his father's lifetime he was known as duc de Chartres. His education was entrusted to Madame de Genlis. In 1791 he entered the Revolutionary army, and took part in the battles of Valmy and Jemappes; was present at the bombardment of Venloo and Maestricht, and distinguished himself at Neerwinden. Dumouriez had formed a scheme for placing him on the throne as a constitutional monarch, and, being included in the order of arrest directed against Dumouriez in 1793, he took refuge within Austrian territory. For twenty-one years he remained exiled from France, living in various European countries, and in America. He had become duc d'Orléans on the execution of his father in 1793, and in 1809 he married the daughter of Ferdinand IV of Naples. After the fall of Napoleon I he returned to France, and was reinstated in his rank and property. At the Revolution of July, 1830, and the abdication of Charles X, he was made 'lieutenant-general of the kingdom', and in August became constitutional king of the French. He reigned for eighteen years (see *France*), when the Revolution of Feb., 1848, drove him from the throne to exile in England.—BIBLIOGRAPHY: L. G. Michaud, *Public and Private Life of Louis Philippe*; *Cambridge Modern History* (vol. x); F. A. Gruyer, *La Jeunesse du roi Louis Philippe*. **Louis-Quatorze Style** (lô-ê-kâ-tor-z), a style

of architecture and internal ornamentation prevalent in France in the reign of Louis XIV. Externally the forms are classical, freely treated, and rustication is much employed; the windows



Panel in Louis-Quatorze Style

are larger and the rooms more lofty and spacious than in buildings of the preceding period, and there is generally an effort at sumptuous elegance. The Palace of Versailles and the east front of the Louvre are prominent examples of



Panel in Louis-Quinze Style

this style. The most characteristic features of the Louis-Quatorze style, however, are seen in the internal ornamental decoration, the great medium of which was gilt stucco-work, and its most striking characteristics are an infinite play of light and shade, and a certain disregard of

symmetry of parts and of symmetrical arrangement. The characteristic details are the scroll and shell. The classical ornaments, and all the elements of the Cinquecento, from which the Louis-Quatorze proceeded, are admitted under peculiar treatment, or as accessories; the panels are formed by chains of scrolls, the concave and convex alternately; some clothed with an acanthus foliation, others plain.—*Louis-Quinze* (lô-ê-kanz) is given to the variety of style which prevailed in France during the reign of Louis XV. In it the want of symmetry in the details, and of symmetrical arrangement, which characterize the Louis XIV style, are carried to an extreme. It is crowded with meaningless parts devoid of beauty and expression. The four varieties of French furniture are referred to under *Furniture*.

Louisville, a city of Jefferson county, Kentucky, United States, sometimes called *Falls City* from the rapids of the Ohio River (descending 26 feet in 2 miles), above which the city stands. It is the largest city of the state, with a river frontage of 7 miles, and connected by bridges with New Albany and Jeffersonville, on the opposite bank of the river, and in the state of Indiana. A canal $2\frac{1}{2}$ miles long carries the river traffic round the rapids. Louisville is a great railway junction and a great centre of trade. There is a university. The city was founded in 1778, and named in honour of Louis XVI of France. It was chartered as a city in 1828. Pop. (1920), 234,891.

Loulé (lo-lâ), a town of Faro, Portugal, with the ruins of a Moorish castle, Moorish walls, and gateway. It has an extensive trade in manufactures from the palm and from coperto grass. Pop. 24,000.

Lourdes (lôrd), a town of Hautes-Pyrénées, France, and one of the chief places of Roman Catholic pilgrimage in Europe. In 1858 a peasant maiden (Bernadette Soubirous) declared that she had been favoured with visions of the Virgin Mary, in the grotto where now stands the shrine devoted to *Our Lady of Lourdes*. The town was in the hands of the English from 1360 (Treaty of Brétigny) until 1406. Pop. about 9000.

Lourenço Marques. See *Delagoa Bay*.

Louse, the common name of about forty species of small wingless insects, parasitic on man and other mammals. There is a simple eye or ocellus, on each side of a distinctly differentiated head, the under surface of which bears a suctorial mouth. There is little distinction between the thorax and abdomen, but the segments of the former carry three pairs of legs. The legs are short, with short claws or with two opposing hooks, affording a very firm hold. The body is flattened and nearly transparent, composed of eleven or twelve distinct segments. The young

pass through no metamorphosis, and their multiplication is extremely rapid. Most, if not all, mammals are infested by lice, each having generally its own peculiar species, and sometimes having two or three. Three species are said to belong to man, viz. *Pediculus vestimenti* (body-lice), *P. capitis* (head-lice), and *Phthirus inguinalis* (crab-lice).

Lousewort (*Pedicularis*), a large genus of Scrophulariaceæ, half-parasitic herbs with their roots attached to those of other plants. Two pink-flowered species, *P. palustris* and *P. sylvestris*, are British. Many handsome kinds are found on the Alps and other high mountains. The belief that these plants induce lousiness in sheep is without foundation.

Louth, a municipal borough of Lincolnshire, England, on the Lud, and connected with the Humber by a canal constructed in 1763. Brewing is carried on, and agricultural implements are manufactured. The church of St. Peter dates from the twelfth century, and there are traces of a twelfth-century Cistercian abbey.

Louth, the smallest county of Ireland, in the province of Leinster; area, 202,181 acres, exclusive of water. In its coast-line are Carlingford Lough, Dundalk Bay, and the estuary of the Boyne. Agriculture is the main industry, but fishing is important; linen is manufactured. Drogheda and Dundalk (the county town) are the principal towns. The county is named after Louth, a village within its boundaries, originally known as Knockfergus. As a county Louth existed from the thirteenth to the fourteenth century as a part of Ulster, and was before that time a fief of Argill.

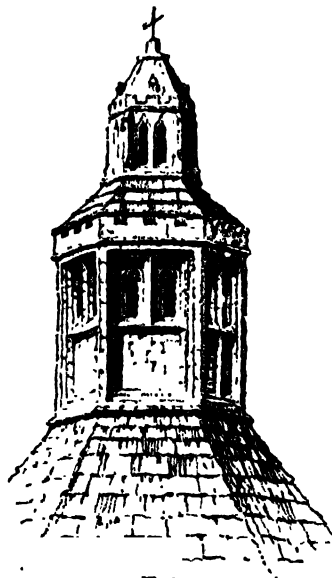
Louvain (lo-van; Fl. *Leuven*; Ger. *Löwen*), a town of Brabant, Belgium, on the Dyle. In shape the town resembles a circle, the circumference being formed by old ramparts, now partially converted into promenades. In the fourteenth century the town was a centre of the cloth trade, but was taken by Duke Wenceslas in 1382, and most of the tradesmen emigrated to escape his persecutions. The university, founded in 1423 by Duke John IV of Brabant, was regarded as one of the most famous in Europe in the sixteenth century, having 8000 students and (1547-1606) 43 colleges. It was closed by the French Republicans, but revived by the Dutch Government in 1817. The Hôtel de Ville was erected between 1447 and 1463, and houses some notable pictures. The church of St. Michael was erected for the Jesuits (1650-66). Outside the town is the Abbaye de Parc, a Morbertinian house founded in 1129, dissolved during the Revolution, but revived in 1836. During the European War Louvain was early occupied by the Germans (19th Aug., 1914); the town was sacked (27th Aug., 1914). The uni-

versity library, with its magnificent collection of books and MSS., was burnt by German troops, but thousands of books were sent out from England in 1921, to replace those destroyed, and an American rebuilding scheme was approved by the Belgian Government. Pop. (1919), 40,069.

Louviers, a town of the department of the Eure, France, with a thirteenth-century church and manufactures of woollens. Pop. 10,209.

Louvois (lö-vwá), François Michel le Tellier, Marquis de, born 1641, died 1691, War Minister in the reign of Louis XIV, was reversionary of the office held by his father (Le Tellier), and became sole minister in 1686. He revolutionized the discipline, commissariat, and equipment of the French army, but also undid the work of Colbert (q.v.) and destroyed the commerce of France. Partly by his advice the Edict of Nantes was revoked (1685) and the Palatinate devastated (1689). His arrogance had long rendered him odious to Louis, and his death was regarded with relief by his master. Louvois's organization of the army lasted till the Empire.

Louvre (lo'ver), in architecture, a dome-turret rising from the roof of a hall or other apartment,



Louvre: the Kitchen, Glastonbury Abbey

formerly open at the sides, but now generally glazed. Louvres were originally intended to allow the smoke to escape when the fire was kindled in the middle of the room. *Louvre window* is the name given to a window in a church tower, partially closed by slabs or sloping boards or bars called *louvre boards* (corrupted into *luffer* or *lever boards*), which are placed across to

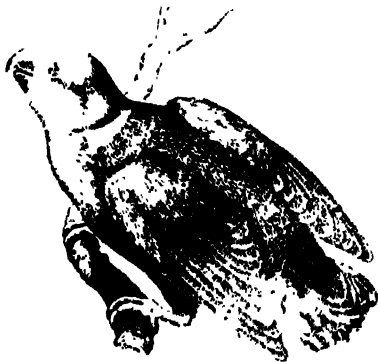
exclude the rain, while allowing the sound of the bell to pass.

* **Louvre.** See *Paris*.

Lovage, a herbaceous perennial umbelliferous plant, genus *Ligusticum*, widely distributed throughout temperate regions. *L. officinale*, common lovage, is sometimes used as an aromatic stimulant. *L. scoticum*, found on the sea-coasts of Scotland, is occasionally used as a pot-herb.

Lov'at, Simon Fraser, Lord, second son of Thomas Fraser of Beaufort, afterwards twelfth Lord Lovat, born 1667, beheaded at Tower Hill, London, 1747. In 1699, on the death of his father, he assumed the title of Lord Lovat, to which on the death of the eleventh Lord Lovat his father had acquired a disputed claim. He effected a forced marriage with the Dowager Lady Lovat, for which he was outlawed and forced to seek refuge in France. After a varied life of intrigue, first on the Hanoverian side and next on the Stuart, and a long imprisonment, claim to his title, which had been objected to in various elections, was finally allowed by the Court of Session in 1730. On the outbreak of the Rebellion of 1745 Lovat acted with his usual duplicity, joined Prince Charles Edward, was captured at Culloden, and executed.—**BIBLIOGRAPHY:** Walter Scott, *Tales of a Grandfather*; W. C. Macleod, *Simon Fraser, Lord Lovat: his Life and Times*.

Lov, a name given to two genera of diurnal birds (Agapornis and Psittacula) of



Swindern's Love-bird (*Psittacula Swinderniana*)

the parrot family. The former genus belongs to the Ethiopian region, and the latter to tropical America. They receive their name from the great attachment shown to each other by the male and female birds. Swindern's love-bird is barely 6 inches in length.

Lovelace, Richard, English poet, was born in 1618, and died in 1658. He was educated at the Charterhouse and at Gloucester Hall, Oxford. Entering the army, he became a captain in 1639.

He was an ardent Royalist, and in 1642 was imprisoned for presenting the Kentish Petition to Parliament. In 1646 he raised a regiment for the service of the French king, France being then at war with Spain, and commanded it in person. He was imprisoned again in 1648; in 1649 he published his principal collection of lyrics, called *Lucasta*. His poetry enjoys a reputation entirely out of proportion to its bulk, owing to his two poems *To Althea from Prison* and *To Lucasta, on going to the Wars*.

Lover, Samuel, Irish novelist and songwriter, born in 1797, and died in 1868. Among his works are: *Legends and Stories of Ireland* (1832-4); *Rory O'More*, a novel (1837); *Songs and Ballads* (1839); *Handy Andy*, a novel (1842); and *Treasure Trove*, a novel (1844). *The Angel's Whisper*, *Molly Bawn*, and the *Low-backed Car* are among his most popular songs.—**CF.** B. Bernard, *Life of Samuel Lover*.

Low Archipelago, an atoll group of Oceania (q.v.) known as the Paumotu and Tuamotu. They are mostly French possessions.

Lowe (lō), Sir Hudson, lieutenant-general, born at Galway 1769, died 1844. In 1813 he was attached to the army of Blücher. On the fall of Napoleon he was appointed Governor of St. Helena, but incurred the aversion of Napoleon, and many charges of undue severity were brought against him which were subsequently refuted. Sir Hudson was allowed to die in poverty. His *Letters and Journals* were published in 1852.—**BIBLIOGRAPHY:** R. C. Senton, *Sir Hudson Lowe and Napoleon*; Sir W. Scott, *Life of Napoleon Buonaparte* (vol. ix).

Lowell, James Russell, American author, born in 1810 at Cambridge, Massachusetts, and died there in 1891. In 1841 he published a small volume of poems entitled *A Year's Life*, and became a regular contributor to various journals, including the *Boston Courier*, in which appeared the first series of the *Biglow Papers*, mainly a satire on slavery and the Mexican War. In 1855 he succeeded Longfellow as professor of modern languages and belles-lettres at Harvard. From 1857 to 1862 he wrote many essays for the *Atlantic Monthly*, founded by Holmes, Longfellow, Emerson, and himself, and of which he was the first editor. He was joint-editor of the *North American Review* from 1863 to 1872. In 1877 he was appointed American Minister at Madrid, and in 1880 he was transferred to London, whence he was recalled in 1885. He was very popular in Britain, was made D.C.L. of Oxford, LL.D. of Cambridge, and rector of St. Andrews University. Numerous editions of his poems have been published.—**CF.** F. Greenslet, *J. R. Lowell: his Life and Work*.

Lowell, a city of Massachusetts, United States, at the confluence of the Concord and

Merrimac Rivers. It is a leading industrial centre, with huge mills and factories operated by the power harnessed from Pawtucket Falls (32 feet drop) on the Merrimac. It is an important railway centre. Founded in 1822, it became a city in 1836. Pop. (1920), 112,750.

Lower Deck, the main gun-deck of ships of the line in the time of Nelson. In modern war-ships the lower deck accommodates petty officers and men in the foremost part, and the term is applied generally to all of them collectively. In in some torpedo-boat destroyers the lower-deck ratings are quartered aft.

Lowestoft, a seaport, municipal borough, and watering-place of Suffolk, England. The harbour is partly formed by two piers (1300 feet long), and there is an esplanade. The fisheries are important. The fourteenth-century church of St. Margaret and the parks are prominent features. Railway connections are provided by the Great Eastern Railway and the joint Midland & Great Northern Railway. During the European War Lowestoft was a naval base, and was bombarded by four German cruisers, assisted by Zeppelins and destroyers, and supported by the German battle-fleet (25th April, 1916). The bombardment lasted for twenty minutes. Another sea-raid was made in Nov., 1916, and aircraft attacks were frequent. Pop. (1921), 44,326.

Low-temperature Carbonization, the distillation of coal at a comparatively low temperature. In ordinary gas-works practice coal is distilled at a temperature of about 1000° C. to 1200° C., compared with 500° C. to 600° C. in the low-temperature processes. The temperature of distillation determines the nature of the products, gaseous and residual, obtained from a given coal. At high temperatures the more volatile hydrocarbons in the coal are removed much more completely, with the result that the residual fuel ('coke') is practically devoid of volatile matter. Very large volumes of gas are also formed. At low temperatures the residual solid fuel (coulite, smokeless fuel, and other trade names) contains about 10 per cent of volatile matter, while a greater proportion of light oils, motor-spirit, &c., is formed, and much less gas. Coal—Britain's most important raw material—is an exceedingly complex mixture of substances, many of which are valuable for chemical purposes, and most of which are combustible. The nitrogen in coal can be recovered as ammonium sulphate, and the nitrogen in fuel is practically Britain's only native source of fixed nitrogen. Large quantities of motor-spirit are imported annually, and the Navy depends more and more on supplies of oil-fuel for its motive power. Both these substances can be obtained by distilling coal. It therefore becomes a question of national importance to ascertain whether it is more ad-

vantageous to burn raw coal, or to treat it by distilling it first at a low temperature. Will the value of the distillation and residual products of 1 ton of distilled coal be sufficiently in excess of the value of 1 ton of raw coal to justify the additional labour and capital costs introduced? No satisfactory answer has yet been found. At present it is doubtful whether there is a satisfactory process of low-temperature distillation—quite apart from economic and national considerations. The greatest technical difficulty arises from the swelling of the coal. The swollen coal forms a kind of 'pudding' which chokes the retorts. To prevent this the coals used must be suitably blended and the heating must be carried on very carefully, and special means must be taken to get the heat applied to the coal throughout its entire body. The systems which have depended upon heating a mass of coal from the outside have all failed owing to this difficulty, and various methods have been adopted to overcome this. In the Del Monte process small coal is fed into the bottom end of an inclined tube about 12 inches in diameter, which is externally heated by gas. The inclined tube slopes at an angle of about 15° to the ground, and has in the centre of it a hollow tube having on the outside an Archimedean spiral blade. Hot gases pass up the centre of this inner shaft, and the outside of the cylinder is also heated. As the shaft rotates, the blades are supposed to drive the coal along. When the coal comes out, it falls into conveyors which remove it. These retorts are very simple mechanically, and the principle is an attractive one, but unfortunately a highly bituminous coal tends to stick, and if sticking takes place, the coal inside the retort will clog up and get wedged in between the blades of the spiral, and the congealed mass will turn round as a solid whole, thus putting the plant out of action. The Tarless Fuel Company of Battersea has a vertical retort which tapers from the bottom to the top and is heated by gas. The inside of the retort has large cast-iron fins cast on it, so that the body of the retort is divided into four or five more or less parallel regions of small section. The inside of the retort is kept under a suction of some 18 to 20 inches of vacuum. The purpose of this is to give the coal a better chance of giving up its 'volatiles' at a low temperature. An obvious difficulty of this method appears to be that of keeping the retort air-tight. All leakage of air into the retort means combustion of fuel and therefore loss in the resulting fuel 'yield'. Another method which has been attempted with a fair measure of success is to heat the coal by passing the necessary volumes of hot gas or superheated steam through it. The former method has been worked out and used by MacLaurin of Glasgow.

The latter method appears to have been used first by Parr and Olin (University of Illinois, *Bulletins* No. 60 and 70), and an improved arrangement of plant, in which this method of heating is used, has been recently patented by Merz & McLellan, Michie & Weeks. The process of treating the gases after they leave the retorts follows very much the lines of ordinary gas-works practice (see *Gas Manufacture*), except that in the MacLaurin process large volumes of gases have to be washed, and in the 'superheated steam process' the distillation-products will first be condensed with the steam used for heating in a highly diluted form. The distillation-products that can be got from coal obviously depend entirely on the constituents of the raw coal. With ordinary bituminous coal the 'yield' per ton of coal would be approximately as follows: L.T. coke, 14.5 cwt.; pitch, 120 lb.; fuel oil, 13 gall.; light oils and spirit, 7.5 gall.; ammonium sulphate, 6 lb.; gas, 3800 c. feet. With a canal or other highly bituminous coal the proportions of fuel oil and light oils would be greater, and that of solid fuel less. See *Coal: Coal-tar*.—BIBLIOGRAPHY: W. A. Bone, *Coal and its Scientific Uses*; A. H. Sexton and W. B. Davidson, *Fuel and Refractory Materials*.

Lowther Hills (lou'ther), a range of Scottish hills extending across the south of Lanarkshire and north of Dumfriesshire to the southern borders of Peebles and Selkirk shires. Highest summits, Green Lowther (2403 feet) and Lowther Hill (2377 feet).

Loyalty Islands, a Pacific group lying around lat. 20° S. and immediately east of the French colony, New Caledonia, of which it is a political dependency. There are three large islands, Maré, Lifou, and Uvea, and many smaller islands and atolls. Area, about 800 sq. miles. Coco-nuts are the staple product; copra and rubber are exported. Pop. about 14,500.

Loyola, Ignatius, original name *Inigo Lopez de Recalde*, the founder of the Jesuits (q.v.), born at the castle of Loyola, Guipuzcoa, 1491, died in Rome 1556. He was a page at the court of Ferdinand and Isabella, but entered the army, and during the defence of Pampeluna against the French (1521) he was severely wounded, and a long and tedious confinement was the result. The only books he found to relieve its tedium were books of devotion and the lives of saints. This course of reading induced a fit of passionate devotion and repentance in which he renounced the world, made a formal visit to the shrine of the Virgin at Montserrat, and vowed himself her knight (1522). After his dedication he made a pilgrimage to Rome and Jerusalem, and from 1524 to 1527 attended the schools and universities of Barcelona, Alcalá, and Salamanca. In 1528 he went to Paris for general and theological

training. Here in 1534 he formed the nucleus of the Society of Jesus, François Xavier, professor of philosophy, Laynez, and others having sworn in conjunction with Loyola to devote themselves to the care of the Church and the conversion of infidels. Rome ultimately became their headquarters, when Loyola submitted the plans of his new order to Paul III, who, under certain limitations, confirmed it in 1540. (See *Jesuits*.) Loyola continued to reside in Rome and govern the society he had constituted till his death. He was beatified in 1607 by Paul V, and canonized in 1622 by Gregory XV. BIBLIOGRAPHY: F. Thompson, *Saint Ignatius Loyola*; H. Joli, *St. Ignace de Loyola*; J. J. Campbell, *The Jesuits (1534-1921)*; see also *Letters and Instructions of St. Ignatius Loyola*, translated by D. F. O'Leary.

Lozère (lo-zär), a department of Southern France, comprising parts of pre-Revolutionary Languedoc and Gévaudan; area, 1996 sq. miles. The department is generally mountainous (Cévennes), Mount Lozère rising to 4884 feet. The general character of the department is pastoral, live-stock being largely raised and cheese-making practised to some extent. The Rivers Allier, Lot, and Tarn rise within the department, which belongs to the basins of the Loire, the Rhône, and the Garonne. The capital is Mende. Pop. (1921), 100,822.

Luang Prabang, a town of French Indo-China, in the Laos country, capital of a protected state of the same name, on the Upper Mekong; in 1904 finally ceded by Siam to France. Pop. 40,000.

Lubao, a town of Pampanga, Luzon, Philippine Islands, 30 miles from Manila by rail, with a large trade in indigo, rice, and sugar. Pop. about 20,000.

Lubbock, Sir John, English politician and naturalist, born in London 1834, died 1913, joined his father's banking business in 1848; partner in 1856; entered Parliament in 1870 for Maidstone; and represented London University from 1880 till 1900, when he was raised to the peerage as Baron Avebury. He was an authority on finance and education, and his name was associated with several important public measures, such as the Bank Holiday and Ancient Monuments Acts. His works include: *Prehistoric Times*; *Origin of Civilization*; *Origin and Metamorphoses of Insects*; *British Wild Flowers in their Relation to Insects*; *Ants, Bees, and Wasps*; *Flowers, Fruits, and Leaves*; and *The Pleasures of Life*.

Lübeck, a free city and state of Germany, and a constituent of the German Reich, 12 miles from the Gulf of Lübeck, on the Baltic; area, 115 sq. miles. The city is the capital of the state, and was formerly surrounded by walls, of which four striking fifteenth-century gates survive.

It was founded by Count Adolphus II of Holstein (1143), ceded to Saxony (1158), and in Danish occupation in 1201. In 1226 Lübeck became a free imperial city, and (1241) the leader of the Hanseatic League (see *Hanse Towns*). France annexed the city in 1810, but renounced all rights after the battle of Leipzig (1813), and Lübeck eventually joined the North German Confederation (1866), becoming a state of the empire in 1870. It is now a republic by Constitution dated 23rd May, 1920, and is governed by a House of Burgesses (80 members), which elects a Senate (12 members). Lübeck Cathedral was founded by Henry the Lion in 1173, and was completed in the fourteenth century. A channel connects Lübeck with the Baltic, but Travemünde (in the state) is the port. Lübeck is a railway junction, and has an extensive trade in timber and wine. Pop. (state, 1919), 120,568; (town, 1919), 113,071.— Cf. W. King, *Three Free Cities*.

Lublin, a town and capital of the government of Lublin, Poland, on the Białyca, with a thirteenth-century cathedral and the ancient palace of John Sobieski. In 1702 Lublin was sacked by Charles XII of Sweden. During the European War it was captured by the Germans (July, 1915). Pop. 73,000.

Lubricants, substances employed to reduce friction between surfaces subjected to loads and moving relative to each other. The lubricant is introduced between the moving parts and holds them apart. When two solid bodies are rubbed together, there is a measurable resistance to the movement, no matter how carefully they have been machined and polished to ensure smoothness. This is caused by the abrasive action of microscopic ridges and projections. Where friction between solids can be reduced to fluid friction by the use of a lubricant, the efficiency of the machine is increased, while the temperature of the working parts and the wear and tear are reduced. Among the substances employed are: *solids*, plumbago, graphite, and soapstone; *semi-solids*, greases, consisting of animal and vegetable oils emulsified with soap and water, or mineral oils thickened with soap; *liquids*, animal, vegetable, and mineral oils, singly or in combination. The characteristics of a lubricant—viscosity, oiliness, body, degree of freedom from corroding acids and from liability to oxidize to gummy and sticky substances, and temperature actions—are found to vary from substance to substance. By suitable blending of the various simple lubricants, a range of substances suitable for all conditions of running is obtained.

Lucan (Marcus Annaeus Lucanus), Roman poet of the Silver Age, was born in A.D. 39, and died in A.D. 65. He was a grandson of Seneca the rhetorician, and a nephew of Seneca the

philosopher. Lucan's father was a very wealthy man, and the poet received the best education procurable. The aim of Roman education at that time was to make a man eloquent, and Lucan proved only too apt a pupil. He astonished everyone by his precocity, and in his early twenties became so well known for his poetry as to excite the jealousy of the Emperor Nero. Nero forbade him to recite in public, and Lucan retaliated for this insult by joining in the conspiracy of Piso. He was betrayed, and in order to save himself offered to give information. He began by denouncing his own mother, and went on to reveal the names of all his fellow-conspirators. He did not succeed, however, in his design of saving his own miserable life. He committed suicide on compulsion by means of opening his veins, and died reciting some lines of his own composition about a soldier who died in like fashion.

Statius was a friend of Lucan's, and in a poem (*Silvae*, ii, 7) addressed to Lucan's widow he names some of the lost works of the poet. They dealt with Hector and Priam, Orpheus, and the burning of Rome. Lucan's one extant work, by which his reputation must stand or fall, is the *Pharsalia*, an epic poem in ten books (the tenth book is imperfect), in which the events of the struggle between Caesar and Pompey are recounted in chronological order. Opinion has differed widely as to the merits of this poem. It has been extravagantly praised and unduly depreciated. The truth is that it has many striking qualities and many grave defects. Lucan was a very young man when he died, and his work has all the defects of a young man's work. A large proportion of his faults, however, are due to the faulty system of Roman education, which increased his natural tendency to prefer epigram to truth, and encouraged him to endeavour continually to make a point. He had many of the qualities of a great poet; he was copious in his diction, lively in his imagination, and bold in his political wisdom. His fluency of writing was fatal to his greatness. He is, however, easily the greatest poet of the Silver Age. The *Pharsalia* is full of well-known quotations such as

Nil actum credens dum quid superasset agendum,

and

Victrix causa deis placuit, sed victa Catani,

or the famous

Jupiter est quodcunque vides, quocunque moveris.

In some passages, too, he challenges comparison with Virgil, though there is a certain monotony in his use of the hexameter. Quintilian, with his usual admirable good sense, has given the final verdict upon Lucan, saying that he is fiery and

vehement, a master of epigram, and a model for rhetoricians rather than for poets.—BIBLIOGRAPHY: C. E. Haskins and W. B. Heitland, *The Pharsalia* (the best English edition); Sir Edward Ridley, *Lucan's Pharsalia Translated*.

Lucania, an ancient division of Southern Italy which extended across from the Tyrrhenian Sea to the Gulf of Tarentum. The Lucanians were a branch of the Samnite nation, and were subdued by the Romans in 272 B.C.

Lucca, a province of Tuscany, Italy. It is mountainous in the north, lying in the Serchio Valley, but is agriculturally productive. The chief seaport, Viareggio, exports oils, wines, silks, and fruits. Area, 555 sq. miles; pop. (1915), 347,169.

Lucca (ancient **Luca**), a city and capital of above province, on the Serchio (ancient *Auser*). The seventh-century church of S. Frediano was founded by the Lombard kings Bertharic and Cunibert to honour St. Frigidianus, an Irish archbishop of Lucca (560-578). The Romans established a colony in Luca about 177 A.D., and it was included in *Gallia Cisalpina*. In 1805 Lucca formed, with Piombino, a principality given by Napoleon to his sister, Princess Elisa Baciocchi. It was incorporated in the Kingdom of Italy in 1860. Pop. (commune), 79,110.

Lucera, a city of Foggia, Southern Italy, with a castle erected by the Emperor Frederick II (of Germany) and rebuilt by Charles I (about 1275), and a Gothic cathedral. Lucera was a Roman colony (*Luceria*) from 314 B.C., but was destroyed in A.D. 663. It was restored by Frederick II, who colonized it with Saracens from Sicily (1231). Frederick died (1250) at the Castel Fiorentino, 6 miles from Lucera.

Lucernaria (Lat., *lucerna*, a lamp), the typical example of the Lucernariidae, a family of the Scyphozoa, nearly allied to many of the jelly-fishes. The most familiar species is the *Lucernaria (Halicystus) auricula*, a little, somewhat bell-shaped organism which is frequently found adhering by its short stalk to sea-weeds, &c. The mouth is situated in the centre of the bell. It can detach itself at will and swim freely about by contracting and expanding the bell-shaped disc or 'umbrella', as it is technically called.

Lucerne (Lö-ern'; Ger. *Luzern*), a city and capital of the canton of Lucerne, Switzerland, on the margin of Lake Lucerne and on the swift-running Reuss, where it emerges from the lake. On the landward side the town is surrounded by walls with nine watch-towers dating from 1385, and the river is spanned by eight bridges, two of which are roofed-in and span the river obliquely. The 'Lion of Lucerne', a monument by Thorwaldsen (1821) to the Swiss guards who fell while defending the Tuileries (10th Aug.,

1792) is noteworthy. The glacier-garden contains relics of the ice period. Lucerne is one of the three seats of the Swiss Diet, has an important grain market, and manufactures silk and cotton fabrics, and carriages. Pop. (1920), 43,000.

Lucerne, the canton, is bounded by the cantons of Aargau, Zug, Schwyz, Unterwalden, and Bern; area, 570 sq. miles. The surface is very much broken by ramifications of the Bernese Alps, but none rise above the line of perpetual snow. Lucerne was admitted into the Swiss Confederation in 1332. The inhabitants are mainly German-speaking Roman Catholics, and their chief occupation is dairying. Pop. (1920), 176,189.

Lucerne (*Medicago*), a genus of leguminous plants containing at least ninety species. The purple medick (*M. sativa*) is a valuable pasture and forage plant extensively cultivated in some of the chalky districts of England and France, and also in America. It is perennial and yields two or more crops in the year. In California it is known by the Spanish name of *Alfalfa*.

Lucerne, Lake of, or Vierwaldstätter-See, meaning 'Lake of the Four Forest Cantons', a Swiss lake bounded by the cantons of Uri, Schwyz, Unterwalden, and Lucerne, and noted for its magnificent scenery and historical associations. Length from Lucerne to Flüelen, 23 miles; width, from $\frac{1}{2}$ to 2 miles; greatest depth, 700 feet; altitude 1434 feet.

Lucian (Lucianus), Greek satirist, was born at Samosata in about A.D. 125, and died soon after A.D. 180. Most of the information which we possess about him is derived from his own writings, and, as it is never quite certain when he is serious and when he is not, it is impossible to be sure of the value of this information. The usually accepted story is that he began his career as apprentice to his uncle, a sculptor, but soon tired of this profession and became a rhetorician. As such he went from place to place displaying his ability as a speaker before audiences interested in eloquence. Lucian travelled in Greece, Italy, and Gaul, and made a great reputation. In his later years he appears to have held the office of procurator of part of Egypt, an honourable and lucrative appointment.

Eighty-two pieces have come down to us under the name of Lucian. Five of these are undoubtedly spurious, eight others and the epigrams are almost certainly spurious, and several others are of doubtful authenticity. Among so many writings, it is only possible to select a few of the best for special mention. The *Dialogues of the Dead*, *Dialogues of the Gods*, and *Dialogues of the Sea-Gods* are perhaps the most famous of Lucian's works. Witty, cynical, and irreverent, they have constantly been admired and imitated. Another famous work

is *True Histories*, a satire on the marvellous tales of poets and logographers. The satire does not spare even Homer himself. This highly amusing book has inspired the production of even greater books, such as *Gulliver's Travels*, and the masterpiece of Rabelais. *Lucius, or the Ass* is of doubtful authenticity, but it is an interesting romance in miniature. It tells the same story that Apuleius tells with many amplifications and in a more mystical fashion in his *Golden Ass*. *Concerning the Death of Peregrinus and Alexander, or the False Prophet* expose with great wit the hypocrisy of two religious impostors. *The Lover of Lying* discusses the reason why some persons take a delight in lying for its own sake. *The Banquet* and the *Sale of Lives* are delightful satires on philosophers and philosophy. Lucian is at his best when attacking quack-philosophers, especially those of the Cynic school. Lucian's chief purpose was to amuse his audience. He was not a reformer or a satirist, but merely a public entertainer. He succeeded admirably in his object. He was singularly free from any prejudices, or indeed from any views, on any subject. He was born a Semite, but received a Greek education; he was a subject of Rome, and yet not a Roman. He was able to derive amusement from almost anything, but especially from worn-out creeds and pretentious philosophies. In his style Lucian closely follows the best Attic models, especially Plato. Altogether Lucian is one of the most charming and entertaining of Greek writers. To place him alongside of his master, Aristophanes (whom he calls, with graceful wit, "a wise and truthful man whose writings are distrusted without reason"), as one of the world's greatest satirists, is to make an extravagant claim for him. His followers, Rabelais and Swift, have surpassed him; but he remains one of the most readable of Greek authors of the second rank.—BIBLIOGRAPHY: H. W. L. Hine, *Lucian: the Syrian Satirist*; M. Croiset, *Essai sur la Vie et les Œuvres de Lucien*; W. L. Collins, *Lucian* (Ancient Classics for English Readers Series); C. Martha, *Les Moralistes sous l'Empire romain*.

Lucifer (or in Greek, *Phosphoros*, both meaning *light-bearer*), a name anciently given to the planet Venus as the morning star. The term is used figuratively by Isaiah (xlv, 12) and applied to the Babylonian king, but it was mistaken by the commentators for a reference to Satan. The passage runs as follows: "How art thou fallen from heaven, O Lucifer, son of the morning!". The name of Lucifer was used in this sense by Milton.

Lucilius, Gaius, an early Roman satirist, grand-uncle to Pompey the Great, born at Suessa 180 B.C., died at Naples about 103 B.C. He is considered the inventor of the Roman

satire, because he first gave it the form under which this kind of poetry was carried to perfection by Horace, Juvenal, and Persius. Of thirty satires which he wrote only some fragments have been preserved.

Lucina, goddess of light, among the ancient Romans, a title given to Diana in her capacity of the goddess who presided over child-birth.

Lucknow, a city of Hindustan, capital of the Lucknow Division of Oudh, United Provinces, and the sixth city of India. It lies along the River Guntl. Among the most notable buildings are the Kaisarbagh, a palace built by Wajid Ali in 1850; the Imāmbarra or mausoleum of Asaf ud Dowlah; the great mosque called the Jamā Masjid, now a jail; the Hoseinabad or Small Imāmbarra, with the mausoleum of Mahommed Ali; the Martinière founded by General Martin, which clothes and educates 120 boys, the Canning College, and several English schools; also St. John's church, American and Roman Catholic churches; library, hospitals, lunatic asylum, and a new university. Lucknow was one of the chief scenes of the Indian Mutiny (1857-8). At the beginning of the mutiny the Residency was fortified by Sir Henry Lawrence, and after his death (4th July, 1857) it was closely besieged by the rebels till relief was brought by Havelock and Outram. The relieving force was only a small one, however, and the British were again besieged, partly in the Residency, partly in a walled garden called the Alambagh. In the middle of October Sir Colin Campbell gained possession of the place after severe fighting; but as it seemed impossible to hold it with the troops at his disposal he left Sir James Outram to defend the Alambagh, and removed the civilians, women, and children to Cawnpore. At last, in March, 1858, Sir Colin returned with a sufficient force, completely defeated the rebels, and permanently recovered the town. Lucknow, once famous for the production of costly jewellery, has still important productions in silver, copper, and brass wares. Pop. 240,000.

Lucretia, a Roman lady who was outraged by Sextus, son of Tarquinius Superbus, King of Rome. She stabbed herself, and her death was the signal for a revolution, by which the Tarquins were expelled from Rome and a republic formed. The story is told by Livy (i, 57-59).

Lucretius (Titus Lucretius Carus), Roman poet, author of the greatest of all didactic poems, was born about 98 B.C., and died about 55 B.C. Of the events of his life we know almost nothing. Our sole authority is St. Jerome's *Chronicle*, which has this entry under the year 94 B.C.: "Titus Lucretius the poet was born. He was subsequently driven mad by a love-philtre. In his lucid intervals he wrote some books which Cicero subsequently edited. He committed

suicide in the forty-fourth year of his age." The truth of all these statements has been questioned. Lucretius was certainly born before 94 B.C., probably in 97 B.C., or 95 B.C. at the very latest. It is exceedingly unlikely that any drug, no matter what its potency, could cause a permanent mental derangement. It is even more unlikely that so long a poem as the *De Rerum Natura* could have been composed during lucid intervals of sanity. It is not a short poem, like those of Cowper, but a poem of over seven thousand lines in length, and a model of close reasoning and clear exposition. It is doubtful whether it was Marcus or Quintus Cicero who edited the poems. Marcus was not in sympathy with the Epicurean system of philosophy, and it is curious that there is no mention in his *Epistles* of his editorial labours. Donatus, who mentions Lucretius's death as having taken place in 55 B.C., does not give any hint of suicide. The whole story of the poet's life is obscure; we are on safer ground in making one or two deductions from his writings. From them it seems clear that he was a native of Rome, that he was of a distinguished if not a noble family, that he was a student of books, especially those of Epicurus, Homer, Euripides, and Ennius, and that he was a lover and close observer of nature.

The great work of Lucretius is a poem in six books entitled *De Rerum Natura*. The first book alone seems to have received the author's finishing touches. The last book breaks off abruptly, and the fourth and fifth show certain redundancies and gaps in the logical order of argument which make it clear that they were not revised by the author. The *De Rerum Natura* is a complete system of philosophy written in the form of a poem. The foundation-stone of the whole magnificent structure is to be found in the line which concludes the unmatchable poem—the address to Venus:

Tantum religio potuit suadere malorum!

Lucretius was convinced in his heart that all human ills were due directly or indirectly to superstition—especially to fear of the gods and fear of death. He thought that if men were taught the truth, that the gods did not interfere in human affairs, and that death brought complete extinction, they would not be afraid of anything in this world or the next. He therefore set out to expound in full the Epicurean system of philosophy, which in his opinion satisfactorily explained all the phenomena of the universe. Book I opens with the address to Venus, and denounces the evils caused by superstition. It then goes on to explain that nothing can be made from nothing, and that nothing can be reduced to nothing. The rest of this book and the whole of the second book are devoted to an

explanation of the atomic theory. The third book distinguishes between the vital and intellectual principles, the *Anima* and the *Animus*, or the soul and the mind, and proves that they are an integral part of the body and can no more have an independent existence than a hand or a foot can. The soul therefore perishes with the body. This book ends with a magnificent passage—unsurpassed in Latin literature—on the folly of fearing death, which effectually extinguishes all our desires and sorrows. The fourth book deals with the theory of the senses, discusses the nature of sleep and of dreams, and ends with a slightly satirical disquisition upon love. The fifth book, which is in many ways the most impressive and interesting, treats of the origin of the world, and of the rise and progress of man, the beginnings of civilization and society, and the invention of the applied and the fine arts. The last book gives an explanation of thunder, lightning, hail, rain, snow, and other phenomena, and ends with a discourse upon diseases and a description of the great plague at Athens.

The subject-matter of Lucretius is most interesting to modern readers. Owing to a combination of good luck and good sense he has hit on many theories which have only been fully worked out comparatively lately. His account of the atomic theory is surprisingly logical and complete. He has grasped the idea that time is a relative thing. He gives a wonderfully accurate description of the origin of species, and enunciates the law of the survival of the fittest. He propounds something not unlike the germ theory of disease. He argues that the world was not specially made for mankind, because if it were it would not be encumbered with so many defects. His views upon heredity (Book iv, line 1218) are in curious accordance with those of the Abbé Mendel. Above all, his account of the rise and progress of civilization is in striking agreement with the views of leading anthropologists of to-day. This aristocratic Roman, who had probably never travelled and never seen any savage races, by a sheer gift of imagination was able to reconstruct the life of primitive man.

Lucretius is, as it were, only incidentally a poet. His main object was to teach, and to free mankind from the shackles of superstition. Much of his material was not susceptible of poetic treatment; he devotes much space to close and cold scientific reasoning. He might well have written in prose had literary fashion permitted. Yet in spite of the numerous defects of his poem it contains some passages unsurpassed not merely in Latin literature, but in human speech. Lucretius is not only a great poet, but a great pioneer in poetry. He found the hexameter rough and crude, and he

left it a perfect instrument, ready for Virgil to use.

The science of Lucretius, based as it was on a series of unverified generalizations, is of great interest but of no importance now. His teachings about religion and morality are still of value. He was not, as many textbooks imply, an atheist and a hedonist. He was a profoundly reverent man, who hated all the base elements in popular religion, and who preached the doctrine that true peace of mind was only to be found by triumphing over fear, ambition, passion, and luxury. Self-control, renunciation, and simple homely pleasures are what he advocates.

There is one quality which, more than any other, makes the *De Rerum Natura* the greatest of all Latin poems. This is its absolute sincerity. It is uncorrupted by that taint of rhetoric which spoils the work of so many of even the best Latin writers. Lucretius scorns the exaggerations and epigrammatic sayings which most Romans delighted in. He is equally sincere in his thinking. He faces unflinchingly all the greatest problems of life. It is this sincerity, no less than his marvellous insight and his absolute command over the haughty Roman tongue, that makes him the loftiest of Roman poets. — BIBLIOGRAPHY: H. A. J. Munro, *Lucretius* (Text, Commentary, and Prose Translation); J. Masson, *Lucretius: Epicurean and Poet*; C. Martius, *Le Poème de Lucrèce*; W. Y. Sellar, *Roman Poets of the Republic*; W. H. Mallock, *Lucretius* (Ancient Classics for Modern Readers Series).

Lucullus, Lucius Licinius, a distinguished Roman naval and military commander, born about 115 B.C., died before 56 B.C. He distinguished himself greatly in his various victorious campaigns against Mithridates, King of Pontus, from the time of Sulla to 66 B.C., when he was supplanted by Pompey. He thenceforward lived in luxurious retirement on the coast of Campania. His house was enriched with a valuable library and works of art, which were freely opened to literary men of all kinds, among whom was his friend Cicero. His example induced other distinguished Romans to draw learned men to Rome at their expense. Lucullus is one of the interlocutors in Cicero's *Academica*.

Luddites, a name given to rioters in 1811–6 in the Midlands, who attributed the prevailing distress to the introduction of machinery. They were named after Ned Ludd, a half-witted lad who once wreaked his anger upon some stocking-frames.

Ludendorff, Erich von, German general, born 1865, educated in the Cadet School at Plön, and posted to the infantry in 1882. In 1898 he joined the General Staff, and lectured in the Military Academy, Berlin, until 1908. He was also

engaged till 1913 (from about 1904) in advising the Operations Staff, who were completing a war programme in anticipation of the German bid for world domination. In 1914 he became chief of this department, and on mobilization he was a major-general and acted as Deputy Chief of Staff to the Second Army, under von Bülow. Eventually he was posted to Hindenburg, whose Eighth Army was engaged on the Russian front, and, as Chief of Staff, Ludendorff directed the great drive that culminated in the slaughter at Tannenberg and the shambles of the Masurian Lakes; he directed the campaign, and Hindenburg reaped the laurels. After the German failure at Verdun, Hindenburg became Chief of General Staff. Ludendorff followed him as Quartermaster-General (26th Aug., 1916), and together they controlled the German army from that time until it was defeated on the *Siegfried Line*. Ludendorff perfected the Hindenburg Line, and organized the German retreat thereto in 1917, where he prepared for his magnificent but disastrous offensive of 1918 by training in mass tactics 106 specially selected and equipped divisions.

Of his strategy it might be said, in parody of the comment on Balaclava, that it was magnificent, but it was not war; it was the highest expression of German iron discipline and of the 'hammer blow'. Had Ludendorff been content in 1918 with storming the British lines, and had he abandoned the plan that led to the disaster on the Lys, the honours might have rested with the German armies, and the European War might have had a very different ending. Ludendorff resigned on 27th Oct., 1918, because, it was stated, "he felt unable to acquiesce in constitutional changes, particularly in the restriction of the Kaiser's authority with regard to army appointments". — BIBLIOGRAPHY: Ludendorff, *The General Staff and its Problems* and *My War Memories* (1919); H. von Zuehl, *Die Schlachten im Sommer 1918 an der Westfront*.

Ludi, a term which comprises the various spectacles and contests of the circus and of the theatre and stadium in Rome and Italy. The great games of the Republic were said to date back to the time of Tarquinius Priscus. There were two principal kinds of games: *ludi scaenici*, the spectacles of the theatre; and *ludi circenses*, the contests of the amphitheatre or circus. The principal games were: (1) *Ludi Megalenses*, 4th–10th April, mainly scenic; (2) *Ludi Cereales*, 12th–19th April (only one day was devoted to the circus); (3) *Ludi Florales*, 28th April–3rd May, essentially scenic; (4) *Ludi Apollinares*, 6th–13th July (only one day devoted to the circus); (5) *Ludi Victoriae Caesaris*, 20th–30th July, gladiatorial shows; (6) *Ludi Romani*, 4th–18th Sept. (the oldest and most important

of the games, both *scenici* and *circenses*): (7) *Ludi Victoriae Sullanae*, 26th Oct.—1st Nov.; (8) *Ludi Plebei*, 4th—17th Nov. The *ludi sollemnes* occupied altogether seventy-six days in the year, of which fifty-five were devoted to *ludi scenici* and the rest to *ludi circenses*.

Ludlow, a municipal borough of Shropshire, England, at the confluence of the Teme and Corve, with the ruins of a Norman castle, destroyed by fire in 1646. Ludlow originated in this castle, which was frequently a royal residence. Milton's *Comus* was first performed at Ludlow in 1634, and here Butler wrote *Hudibras*. One of the town gates (Broad Gate) is still extant. Pop. (1921), 5077.

Ludlow Series, in geology, the uppermost series of the Silurian (Upper Silurian) system of strata, characteristically developed at Ludlow in Shropshire.

Ludwig, the German form of *Louis* and *Lewis*. The German emperors who bore this title are as follows:

	Born.	Died.	
Louis I.	778	840	son of Charlemagne.
Louis II.	825	875	son of Lothaire I.
Louis III.	880	929	Grandson of Louis II.
Louis IV.	893	911	Son of Arnulph.
Louis V.	1288	1347	Elected Emperor.

See *France*; *Bavaria*; *Germany*; *Louis*.

Ludwigsburg, a town of Württemberg, Germany, founded by Duke Eberhard Ludwig of Württemberg in (about) 1705, and formerly the military dépôt of the duchy. Pop. (1919), 23,306.

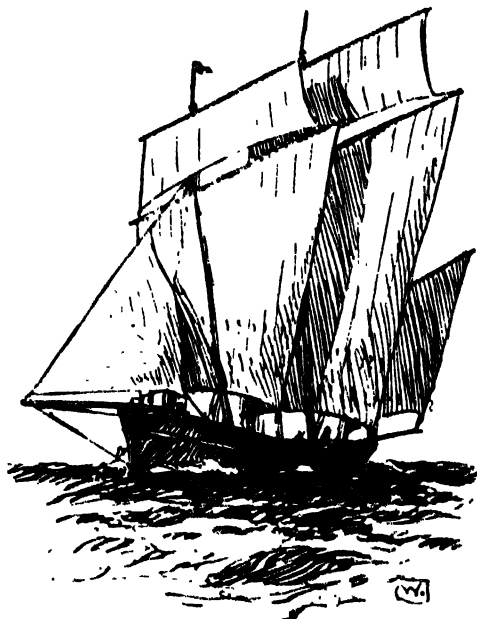
Ludwigshafen-am-Rhein, a town of Bavaria, founded by Louis I (Ludwig), King of Bavaria, in 1843. It stands on the Rhine opposite Mannheim, and has a good harbour and vast chemical works. The Allies bombarded the town from the air during the European War, when it was a German air-craft dépôt. Pop. (1919), 90,721.

Luffa, a genus of Cucurbitaceae. The familiar loofah consists of the dry remnant (vascular system) of the gourd-like fruit.

Lugano, a lake of Central Europe, the bulk of which is in the canton of Ticino, Switzerland, the north-east area being in Italy. It is situated between Lakes Maggiore and Como, and is approximately 20 miles long by $1\frac{1}{2}$ miles broad. The greatest depth is 945 feet. It is the ancient *Ceresius Lacus*. There is a regular lake-steamer service.

Lugano, the largest town of the canton of Ticino, Switzerland, 905 feet in altitude, on the north shore of Lake Lugano. Politically the town is Swiss, otherwise it is Italian. The fifteenth-century church of San Lorenzo is the main historical building. Pop. (1920), 13,281.

Lugger, a small vessel carrying either two or three masts and sometimes a running bowsprit. The masts carry each one or two lug-sails, and on occasion topsails and jibs. The lug-sails are



Lugger

hung obliquely to the masts. These vessels sail particularly well close to the wind and close hauled.

Lugo, a maritime province of North-Western Spain, with a seaboard on the Bay of Biscay. It is very mountainous and afforested, and devoted mainly to agriculture and stock-raising. Lugo was repeatedly devastated by the French under Soult, Ney, and Marchand in the Peninsular War. Area, 3814 sq. miles; pop. (1920), 474,100.

Lugo, capital of the above province, on the River Minho, at an altitude of 2050 feet. It is the *Lucus Augusti* of the Romans, who built the city walls, which are still extant. Lugo was successively in the hands of the Suevi, Moors, Normans, and Alfonso III, and was sacked by the French (1809) and Carlists (1835). The cathedral was built in 1120, but has been modernized in parts. Pop. about 35,000.

Luini (ly-c'ne), Bernardino, a painter of the Lombard school, and the most distinguished pupil of Leonardo da Vinci, was born at Luino, a village on Lake Maggiore, about 1475, died perhaps about 1540. His works, both in oil and fresco, are much admired. Of the latter one of the most important is a *Crucifixion* of great size and with various supplementary scenes on the wall of a chapel at Lugano.

Luke, St., the evangelist, author of the Gospel which bears his name and of the *Acts of the Apostles*. He was probably born at Antioch, in Syria; was taught the science of medicine, but the tradition that he was also a painter is doubtful. The date of his conversion is uncertain; he is supposed to have been one of the seventy disciples, and also one of the two who journeyed to Emmaus with the risen Saviour. He was for several years a companion of the Apostle Paul in his travels, so that in the *Acts of the Apostles* he relates what he himself had seen and participated in. (See *Acts of the Apostles*.) Luke is apparently mentioned three times in the New Testament: *Col.* iv, 14; *2 Tim.* iv, 11; *Philem.* 24. He lived to an advanced age, but whether he suffered martyrdom or died a natural death it is impossible to determine. The *Gospel of St. Luke* was written probably about A.D. 58-60. It is addressed to a certain Theophilus, and records various facts connected with the early life of Jesus which were probably furnished to the writer by Mary herself. It is first quoted by the Church writers Justin Martyr and the author of the *Clementine Homilies*, and at the time of Irenæus and Tertullian the Gospel in its present form was fully accepted. See *Gospel*.— Cf. Sir W. M. Ramsay, *Luke the Physician, and other Studies*.

Luleå (lō'le-o), a seaport and capital of Norrbotten Län, Sweden, founded 1621, and frequently sacked by Russian marauders. It exports iron and timber. Pop. (1920), 10,281.

Lully, Raymond (*Doctor Illuminatus*), scholastic philosopher, born in Majorca about 1235, died in Algeria 1315. When about thirty years of age, he renounced the world and devoted himself to philosophy and religion. Encouraged by visions, he undertook the task by studying the Eastern languages in order to convert the Moslems. For this purpose he made several journeys into Northern Africa, during one of which he was stoned to death. He was canonized in 1410. The number of his works is usually estimated at 300. They include treatises on logic, metaphysics, grammar, theology, casuistry, geometry, astronomy, and medicine.

Lumbago is pain in the muscles of the lower part of the back, due to pathological changes in them, and is one of the common minor maladies. It is a form of muscular rheumatism, and may arise after exposure to wet and cold, or after unaccustomed strain or injury to the muscles. The pain, which is sharp and cramp-like in character, comes on suddenly, and is much aggravated by any movement which stretches the muscles, with the result that the patient walks slightly bent forward and holds the spine rigid. After a time the pain becomes less intense and more diffuse. Rest and the application of warmth

to the back are the two most important steps in treatment, while large doses of salicylates are usually given. The condition frequently becomes chronic, and leads to stiffness of the back.

Luminous Paint, a paint containing phosphorescent materials which emit a feeble glow in the dark after being exposed to sunlight or other light rich in ultra-violet rays. The earliest-known luminous paint was 'Bologna phosphorus', which consists of impure barium sulphide prepared by heating barium sulphate with carbon. The sulphides of calcium and strontium are also used, and behave in a similar manner. A luminous paint which will continue to glow in the dark indefinitely and does not need to be exposed to light is made by incorporating a very small quantity of a radium compound with a phosphorescent substance. Such paints are now used for illuminating gun-sights, compasses, and other instruments when used at night.

Lump-fish or Sucker (*Cyclopterus lumpus*), a spiny-finned fish, so named from the clumsiness of its form. The back is arched and sharp, the belly flat, the body covered with numerous bony tubercles, and the ventral fins modified into a sucker, by means of which it adheres with great force to any substance to which it applies itself. Before the spawning season it is of a brilliant crimson colour, mingled with orange, purple, and blue, but afterwards changes to a dull blue or lead colour. The eggs are guarded by the male. It has been known to attain the weight of 20 " and its flesh is very fine at some seasons, though insipid at others. It frequents the northern seas and is also called *Cock-paddle*, *Lump-sucker*, and *Sea-suck*.

Lunacy, in law. Lunatics are not legally responsible for their acts, but, before the law, all persons are considered sane until the contrary is proved. In England, when it appears that at the time of committing a criminal act the accused was insane, a special verdict, 'guilty but insane', is returned, and the accused is remitted to custody during the king's pleasure. If, though sane at the time of the offence, he is insane when brought to trial, the trial is not proceeded with, but he is detained in custody during the king's pleasure. In the affairs of a lunatic the Crown is, by law, trustee of the estate, and powers of administration are vested in the Lord Chancellor. When a person is sent to a lunatic asylum, the person sending the lunatic must obtain certificates of lunacy, under the proper forms, from two medical men. The lunatic can demand an inquiry into his case before a jury by petition to the Lord Chancellor, such inquiry to be confined to the question whether the alleged lunatic is of unsound mind

and incapable of conducting his own affairs. What constitutes irresponsibility is still a point of much obscurity. In Scotland the care and custody of lunatics belong to the Court of Session, and an examination of an alleged lunatic is held before a judge and jury.

Lunatic Asylums, houses established for the treatment of insane persons. Some are established by law, others by the endowments of charitable donors, while others are private establishments. Until near the close of the eighteenth century many lunatics were allowed to wander at large, exposed to all the arbitrary cruelty to which their defenceless condition made them liable, while those who were confined in asylums were in a still worse case. Chains, whipping, and confinement in dark dungeons were among the ordinary discipline of these establishments. Although the chief credit for urging a more human and reasonable treatment is due to the English Quakers, the reformation of this brutal system was begun in France by Philippe Pinel, a benevolent physician; and in England a parliamentary inquiry in 1815 into the barbarities hitherto practised in lunatic asylums led to a slow but gradual improvement. Lunatic asylums, whether public or private, are now under the control of officers appointed under special statutes, and lunatics must be visited at least once a year by medical and legal visitors. The general conduct of lunatic asylums is now brought more in harmony with humanity, but earnest efforts are being made to introduce reforms, so as to secure the more efficient treatment of insensate, the curable and more hopeful stages of the disorder. Violence and undue coercion have been generally abandoned, persuasion and other measures resorted to for the control of the patients. Various services and recreations of various kinds are also provided.

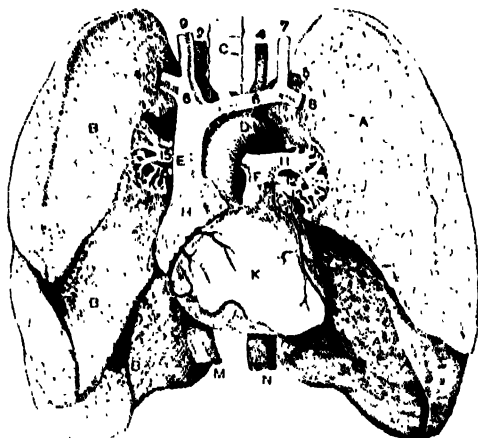
Lund, an ancient town of Malmö, Sweden, said to have been a wealthy stronghold in the tenth century. The first bishop was appointed, and the bishopric was elevated into an archbishopric. The university was founded in 1668, and the Romanesque cathedral was consecrated in 1682. Pop. (1920), 22,827.

Lundy Island, an island of Devonshire, England, at the entrance of the Bristol Channel, 2½ miles long and 1 mile broad; area, about 1000 acres. It belonged to the pirate family of Marisco, who built a castle and round towers. The island is granite. There are two lighthouses. The family of Heaven owned the island from 1813 to 1916, but it was bought in 1917 by A. L. Christie. Pop. 40.

Lüneburg (lū'ne-burh), a town of Hanover, Prussia, on the Ilmenau, with a thirteenth-century town house, gypsum- and lime-quarries, and a salt-mine. Pop. 27,790.

Lunéville, a town of Meurthe-et-Moselle, France, at the confluence of the Vezouse and Meurthe. The Peace of Lunéville between France and Austria was signed in Lunéville, 3rd Feb., 1801. During the European War the town was occupied by the Germans (Aug. 1914), but was evacuated in September of that year. Pop. 25,500.

Lungs, the sole breathing organs of reptiles, birds, mammals, and in part of amphibians (frogs, newts, &c.), the latter forms breathing in early life by branchiae or gills, and afterwards



The Lungs with the Heart and its Blood-vessels

The lungs are turned to the side and the pericardium removed to show the heart. A, A, Upper and lower lobes of left lung; B, B, Upper, middle, and lower lobes of right lung; C, Trachea; D, Arch of aorta; E, Superior vena cava; F, Pulmonary artery; G, Left, and H, Right auricle; K, Right ventricle; M, Inferior vena cava; N, Descending aorta; 1, Innominate artery; 2, Right, and 4, Left common carotid artery; 3, Right, and 5, Left subclavian artery; 6, 6, Right and left innominate vein; 7 and 9, Left and right internal jugular veins; 8 and 10, Left and right subclavian veins; 11, 12, 13, Left pulmonary artery, bronchus, and vein; 14, 15, 16, Right pulmonary bronchus, artery, and vein.

partly or entirely by lungs. The essential idea of a lung is that of a sac communicating with the atmosphere by means of a tube, the *trachea* or windpipe, through which air is admitted to the organ, and through structural peculiarities to its intimate parts, the air serving to supply oxygen to the blood and to remove carbonic acid. In the Mammalia, including man, the lungs are confined to and freely suspended in the cavity of the thorax or chest, which is completely separated from the abdominal cavity by the muscular diaphragm or 'midriff'. In man the lungs are made up of honeycomb-like cells which receive their supply of air through the bronchial tubes. If a bronchial tube is traced, it is found to lead into a passage which divides and subdivides, leading off into air-cells. The walls of these air-cells consist of thin, elastic,

connective tissue, through which run small blood-vessels in connection with the pulmonary artery and veins. By this arrangement the blood is brought into contact with, and becomes purified by means of the air. The impure blood enters at the root of the lung through the pulmonary artery at the right side of the heart, and passes out purified through the pulmonary veins towards the left side of the heart. Both lungs are enclosed in a delicate membrane called the *pleura*, which forms a kind of double sac that on one side lines the ribs and part of the breast-bone, and on the other side surrounds the lung. Pleurisy arises from inflammation of this membrane. The lungs are situated one on each side of the heart, the upper part of each fits into the upper corner of the chest, about an inch above the collar-bone, while the base of each rests upon the diaphragm. The right lung is shorter and broader than the left, which extends downwards further by the breadth of a rib. Each lung exhibits a broad division into an upper and lower portion or *lobe*, the division being marked by a deep cleft which runs downwards obliquely to the front of the organ; and in the case of the right lung there is a further division at right angles to the main cleft. Thus the left lung has two, whilst the right lung has three lobes. These again are divided into *lobules* which measure from $\frac{1}{4}$ to $\frac{1}{2}$ inch in diameter, and consist of air-cells, blood-vessels, nerves, lymphatic vessels, and the tissue by which the lobules themselves are bound together. The elasticity of the lungs by which they expand and expel the air is due to the contractile tissues found in the bronchial tubes and air-cells, this elasticity being aided by a delicate, elastic, surface-tissue. (See *Respiration*.) The lungs are popularly termed 'lights', because they are the lightest organs in the body, and float when placed in water, except when they are diseased: a characteristic test which is applied in medical jurisprudence to determine whether an infant has respired or not.

Lungwort, *Pulmonaria officinalis*, nat. ord. Boraginaceae, a common garden flower, having red and purple tubular blossoms, and leaves speckled like diseased lungs, hence an old-fashioned remedy in pulmonary diseases.

Lupercalia, a Roman festival celebrated annually in honour of Lupercus, an ancient pastoral god, afterwards identified with the Arcadian Pan. It was celebrated on the 15th Feb. at the Lupercal, a grotto in the Palatine Hill at Rome. Goats were sacrificed, and two youths were arrayed in the skins. With thongs in their hands they ran through the streets of the city striking all persons they met, particularly women, who believed that a blow from the thong prevented sterility.

Lupine (*Lupinus*), a very extensive genus

of hardy annual, perennial, and half-shrubby plants, some of which are cultivated in gardens for the sake of their gaily-coloured flowers. They belong to the nat. ord. Leguminosae.

Lu'pullin, the fine yellow powder of hops, which contains the bitter principle. It consists of little round glands, which are found upon the stipules and fruit, and is obtained by drying, heating, and then sifting the hops. It is largely used in medicine.

Lupus is the most common form of tuberculosis of the skin. It appears as yellowish-brown areas, about the size of a hemp-seed, which usually run together, forming irregular patches. They are in the true skin, and the epidermis runs unbroken over them. Later the condition may take on different varieties, according to complications and secondary changes. The most common situation for lupus to be found is the face, where it usually begins at the edge of the nose or eyelids, spreading outwards in the skin. It is also frequently seen in the neck, but may occur in the skin of any part of the body. It spreads slowly, but, if left untreated, leads to much destruction of tissue and disfigurement. The most satisfactory methods of treatment are X-rays, Finsen light, or radium.

Luray Cavern, a stalactite cavern of Virginia, United States, near the village of Luray, discovered in Aug., 1878, by Andrew J. Campbell. It is 260 feet deep and electrically lighted.

Lurcher, a dog that lies in wait for game, as hares, rabbits, partridges, &c., drives them into nets, runs them down, or seizes them. This species of dog is said to be a cross between the collie and the greyhound, and is more used by poachers than by sportsmen.

Lurgan, a market-town of County Armagh, Ulster. The town was founded by William Brownlow in the reign of James I, and the house of his ancestors (the Lords Lurgan), an Elizabethan mansion, is near. The town is noted for its linen manufactures. Pop. 12,000.

Luristan, a mountainous province of Western Persia, with an area of about 20,000 sq. miles. It is named after the Luri, a race divided into many tribes, all migratory and warlike. The only town is Khorramabad, situated in a fruitful plain south of Hamadan. Pop. about 300,000.

Lusa'tia (Ger. *Lausitz*), an extensive region of Germany, now included partly in Prussia, partly in Saxony.

Lushai Hills, a wild district on the north-east frontier of India, lying along the southern side of the Assam district of Cachar, the east side of the Bengal district of Chittagong, and extending on the east into Burmah. This territory is occupied by numerous nomadic tribes called Lushais or Kukis, who, since the expedition of

1871, have been submissive to British rule. The district was annexed by Britain in 1890. The natives bring down to the markets on the plains ivory, raw cotton, bees' wax, and caoutchouc.

Lusignan, a town of Vienne, France, with an eleventh-century church which arose from a monastery chapel founded there about 1025. The House of Lusignan provided kings both of Cyprus and of Jerusalem during the Crusades, and kings of Armenia between 1340 and 1375. Pop. 2000.

Lusitania, the ancient name of a large Roman province, comprising modern Portugal and the province of Estremadura, with part of Leon, Spain. The inhabitants were a Spanish tribe known as the Lusitani, and were brave and warlike in their resistance to the Roman invasion. Mérida, the ancient *Augusta Emerita* was the Roman capital, but *Olisipo* (Lisbon) was the chief town of the Lusitani.

Lute, a stringed musical instrument of the guitar kind, formerly very popular in Europe. It consists of four parts, viz. the table or belly with a large sound-hole in the middle; the body, ribbed like a melon, having nine or ten ribs or divisions; the neck, which has nine or ten stops or frets which divide the strings into semitones; and the head or cross, in which are fitted the pegs or screws for tuning the strings, of which there are five or six pairs, each pair tuned in octaves or unisons. The strings are struck by the fingers of the right hand and stopped on the frets by those of the left. The lute, known to the old Egyptians, was adopted by the Persians, from whom it passed to the Arabs. The latter introduced it into Spain, and during the fourteenth century it was introduced into other European countries.

Luther (lo'ther; Ger. pron. lo'tér), Martin, Protestant reformer, born at Eisleben 1483, and died there 1546. His father, a miner in humble circumstances, soon after Martin's birth removed with his family to Mansfield, where young Martin was brought up, piously but with some severity. At the age of fourteen he was sent to school at Magdeburg, whence he was sent in 1499 to Eisenach. In 1501 he entered the University of Erfurt, and in 1505 received the degree of Master. About this time he discovered in the library of the university a Latin Bible, and found, to his no small delight, that it contained more than the excerpts in common use. He was destined by his father to the law, but his more intimate acquaintance with the Bible induced him to turn his attention to the study of divinity, with the view of entering monastic life. Contrary to the wishes of his father, he entered the monastery of the Augustines at Erfurt in 1505. In 1507 he was consecrated priest, and in 1508, by the influence of his patron,

Staupitz, who was provincial of the Order, he was made professor of philosophy in the new University of Wittenberg. In 1510 he visited the court of Pope Leo X at Rome on business connected with the Order. Returning to Wittenberg, he was made Doctor of Theology (1512). At that time he had no controversy with the Pope or the Church, but the arrival in 1517 of John Tetzel in Wittenberg selling indulgences for sins roused the fiery energy of Luther, and caused him to draw up his famous protest in ninety-five propositions, which he nailed to the church-door in Wittenberg. The result was that the sale of indulgences ceased, Tetzel fled, and a great religious commotion spread rapidly through Germany. Luther was summoned to Rome to explain his heretical proceedings, but refused to go; nor were the efforts of Cardinal Cajetan able to effect a reconciliation between him and the Pope. His dispute with Dr. Eck at Leipzig in 1519, in which he denounced indulgences and questioned the authority of the Pope, was followed in 1520 by a Bull of annathema—a document which Luther burned publicly in Wittenberg. This open defiance of Rome required him to vindicate his conduct, which he did in a pamphlet addressed to the Christian Nobles of Germany, with the result that many of the worthiest rallied to his aid. When summoned to appear before the German Emperor, Charles V, at the Diet of Worms (1521), Luther appeared, acknowledged his writings, made an eloquent defence, but refused to recant. When he retired in triumph from Worms, he was met by a friendly troop of soldiers belonging to Frederick the Elector of Saxony, who conveyed him to the castle of Wartburg, where he lay in concealment for nearly a year. Here he employed his time in translating the New Testament into German, but when he heard that disturbances had been excited in Wittenberg on the question of images, he could no longer bear the restraint of inaction. Returning suddenly, and at great danger to himself, Luther succeeded in quieting the people by means of a wise and patient moderation. In 1524 he laid aside his cowl as a priest of the Roman Church, and in 1525 married Catharina von Bora, one of nine nuns who had renounced their religious vows under his teaching. The wisdom of this marriage was doubted by his friends, but the companionship of his wife and six children contributed greatly to the happiness of the reformer. From the year 1521 Luther had been busy translating the Bible into German with the aid of Melancthon and others, and the great task was completed in 1534. This important work, taken in connection with the Protestant Confession made at Augsburg in 1530, served to establish the reformer's doctrines in Germany,

and closed the important part of his public life. He continued, however, till the end his private work of teaching, preaching, and writing. The massive character of the German reformer lay along simple lines, and found its full and direct expression in his work.—**BIBLIOGRAPHY:** A. C. McGiffert, *Martin Luther: the Man and his Work*; H. Grisar, *Luther*; H. E. Jacobs, *Martin Luther: the Hero of the Reformation*.

Lutherans, the adherents of Luther, a term now applied to one of the great sections into which the Protestant Church on the continent of Europe is divided, the other being known as the Reformed or Calvinists. The doctrinal system of the Lutheran Church is contained in the Augsburg Confession (q.v.), and other documents, including the two catechisms of Luther. The fundamental doctrine is that we are justified before God, not through any merits of our own, but through faith in His Son. In the eucharist the belief of the Lutherans is known as consubstantiation (q.v.). Lutheranism extended in the time of its founder over the greater part of Germany, and became also the established religion of Sweden, Norway, and Denmark. The membership of the Lutherans is estimated at 60,000,000. In America they have a membership of 2,463,265 (1917).

Luton, a municipal borough of Bedfordshire, England, on the River Lea, once the centre of the straw-plaiting industry, commemorated by the Plait Hall (formerly the straw-plait market). Luton is the ancient *Luytunc*. Pop. (1921), 50,077.

Lutterworth, a town of Leicestershire, on the Swift. In the church of St. Mary John Wycliffe was rector from 1374 to 1384, and the top of the present carved oak pulpit is stated to be part of Wycliffe's. He was buried at Lutterworth (1387), but his ashes were subsequently thrown into the Swift (1428). Pop. 1900.

Lützen, a town of Prussian Saxony. At Lützen Gustavus Adolphus of Sweden defeated Wallenstein (16th Nov., 1632). In 1813 the allied Russian and Prussian armies under Wittgenstein and Blücher attacked Napoleon as the French were entering Lützen. After a terrific battle Napoleon was victorious. Pop. 4080.

Luxembourg (lük-sän-bor). François Henri de Montmorency-Bouteville, Duc de, Marshal of France, born 1628, died 1695. He was related to and a close associate of Condé, with whom he engaged in the Fronde, and both fled to Spain. Luxembourg was pardoned in 1650, and in 1668 served under Condé. He defeated William of Orange (1672), and became famous by a retreat from Utrecht, defeating William, then King (William III) of England, again at Louze (1691), Steenkirk (1692), and Neerwinden (1693).

Luxembourg, a southerly province of Bel-

gium, adjoining the Grand-Duchy of Luxembourg, with which it was united until 1840. It is mountainous (Ardennes), and is the least populous district of Belgium. Area, 1706 sq. miles; pop. (1919), 231,200.

Luxembourg, Grand Duchy of, an independent state bordered by Rhenish Prussia, France, and Belgium. It forms part of the Ardennes Plateau, and drains almost entirely into the Moselle basin. The inhabitants are Teutonic, but French-speaking, and the predominant religion is Roman Catholicism. Mining is the principal industry, but agriculture is fairly extensive. Area, 999 sq. miles; pop. (1916), 263,824. The tenth-century countship of Lützelburg was erected into a Duchy in 1354 as Luxembourg, and from about 900 until 1443 Luxembourg formed a part of the Holy Roman Empire. Between 1443 and 1506 it was united to Burgundy. The present Grand-Duchy forms the eastern half of the old Duchy of Luxembourg, and was in Spanish hands from 1506 to 1714, when it passed to Austria, changing over again in 1796 to the French, with whom it remained until 1815. By the Congress of Vienna it was raised from a Duchy to a Grand-Duchy and included (until 1866) in the German Confederation. By the Treaty of London (1867) it was declared neutral territory with a separate administration. On the death of William III of Holland (1890) the Grand-Duke Adolf of Nassau (1817-1905) succeeded as reigning Grand-Duke, and he in turn was followed by his son William. During the European War Luxembourg was overrun by German troops (1st-2nd Aug., 1914), and plundered of raw material and food. It was evacuated on 11th Nov., 1918, and a referendum taken in 1919 placed the state under the Grand-Duchess Charlotte (born 1896), who succeeded her sister (abdicated) in Jan., 1919. The Grand-Duchy is governed by a Chamber of Deputies, and a Cabinet consisting of the Minister of State and four Directors-General. The state is in economic alliance with Belgium. (Cf. R. Putnam, *Luxembourg and her Neighbours*; G. Renwick, *The Grand Duchy of Luxembourg and its People*. **Luxembourg**, a town and capital of the Grand Duchy of Luxembourg, formerly *Lützelburg*. It was once a fortress of the German Confederation, and the fortifications, partly cut out of solid rock, were demolished under the Treaty of London (1867), only the Spanish towers and a few ruins now remaining. The construction of these works occupied 500 years (about 1313-1866), and the site is now a public park. Pop. 20,355.

Luxeuil, a town of Haute-Saône, France, the ancient *Lixocium*, celebrated for its baths. Pop. 5000.

Luxor. See *Egypt*; *Karnak*; *Thebes*.

Luz, the name of two cities of Palestine, one of which was Beth-el, and the other a hitherto unidentified Hittite city (*Judges*, i, 23-26). The site of Beth-el is believed to be that of the present Beitin, a miserable place of some 300 inhabitants.

Luzon, the largest of the Philippine Islands. There are several volcanic peaks rising above 4000 feet (Mayón, 7916 feet). A railway runs from Manila to Lingayén Gulf (opened 1892). The population comprises aboriginal Negritos, Filipinos, and Chinese, with a European colony and some 8000 Americans. Rice, manila, hemp, tobacco, coffee, and ginger are produced, and ebony is supplied by the afforested interior. Manila is the capital, other towns (with their pops.) being Laoag (46,000), Albay (43,000), Vigan (18,000), and Naga (15,000). Area, 40,814 sq. miles; pop. about 3,800,000. — Cf. C. Crow, *America and the Philippines*.

Lyautéy, Louis Hubert, Marshal of France, member of Académie Française and French colonial administrator, was born at Nancy in 1854. He graduated from St. Cyr in 1875 as lieutenant of chasseurs à pied, and saw service in Algeria (1880-2), Tonkin (1894-7), and Madagascar (1897-9, 1900-2), being appointed brigadier-general in 1903 and aeral division in 1907. In 1912 he became Lieutenant-General of Morocco (French sphere) throughout the European War, except between 1916 and 18th May, 1917, when he was at the War Office. Lyautéy consolidated French influence in Morocco and gained the unswerving loyalty of the native chiefs. He received the baton of a marshal in Feb., 1921. His *Lettres du Tonkin et de Madagascar* were published in two volumes during 1922.

Lycanthropy (Gr. *lykos*, a wolf, and *anthrōpos*, a man), a belief that is very widespread among most of the people in all parts of the earth, both in ancient times and at the present day, that certain individuals have the power of transforming themselves, or of being transformed against their will, into wolves (or tigers, cats, or other carnivores) who roam abroad and inflict injuries upon human beings or damage to their property, and then resume their human shape and character. Such beliefs are held at the present day in parts of Europe, in Egypt and Western Asia, in Assam and China, and in America. Lycanthropy, or the belief in werewolves or wereanimals, is very ancient. So far as can be discovered, the belief originated from the ancient Egyptian myth that when the Great Mother was impelled to destroy mankind to avenge their sins, she assumed the form of a lioness and was called the Destroyer (Sekhmet). See *Werewolf*.

Lycaonia, an ancient district of Asia Minor,

situated between Galatia, Cilicia, Cappadocia, and Isauria, of which the capital was Iconium (Konia), which was said by Xenophon to be a town of Phrygia, but is located in Lycaonia by all other writers. It was visited by Paul and Barnabas coming from Antioch of Pisidia (*Acts*, xiv, 1), and is now included in the vilayet of Konia.

Lychnis (lik'nis), a genus of usually erect, annual, biennial, and perennial herbs, belonging to the nat. ord. Caryophyllaceae, or pinks. Some of them bear beautiful flowers. The scarlet lychnis, ragged robin, and rose campion are well known.

Lycia, an ancient maritime province in the south of Asia Minor, bounded by Caria on the west, Pamphylia on the east, and Pisidia and Phrygia on the north. It was colonized by the Greeks at a very early period, and its historical inhabitants were Greeks, though with a mixture of aboriginal blood.

Lycoperdon, a genus of Fungi, group Gastromycetes, commonly called *puff-balls*. In a young state they are edible.

Lycophron, born at Chalcis, in Eubœa, a Grecian poet and grammarian, the author of several tragedies, who lived at Alexandria, 280 B.C. Suidas gives the titles of twenty of his tragedies, but of all his writings there remains only his *Cassandra* (Alexandria), an iambic poem of about 1500 lines. It is a continued soliloquy, in which Cassandra predicts the fall of Troy and the fate of all the heroes and heroines who shared its ruin.

Lycopodium, a genus of plants of the nat. ord. Lycopodiaceae. Six species are found in Britain, of which the most conspicuous is the *L. clavatum* or common club-moss, the yellow powder in the spores of which burns explosively, and is used for producing theatrical lightning. It is known as lycopode or vegetable brimstone.

Lycopods, or **Lycopodiales**, one of the primary subdivisions of the Pteridophyta, characterized by the small, spirally arranged leaves and the relatively bulky sporangia, borne on the upper surface, or in the axils of special leaves aggregated into terminal cones. The type-genus is *Lycopodium*, with about 100 species. Another section of the group, in which each leaf bears a *ligule*, comprises *Selaginella*, with 500 species, mostly tropical shade-plants, and *Isetes*; also the important fossil families *Lepidodendrea* and *Sigillariae*, which consisted of large trees. The living *Lycopods* are small herbaceous plants, inhabiting heaths, moors, and woods, or growing epiphytically.

Lycurgus, the great legislator of the Lacedæmonians, was the son of Eunomus, King of Sparta. His history commences with the year 898 B.C., when he might have usurped the throne

on the death of his brother, but preferring to guard the kingdom for the unborn child of the latter, he devoted himself to the study of legislation. On his nephew becoming of age, Lysurgus travelled into Crete, Egypt, and Asia, and thus prepared himself to give Sparta the laws which have rendered his name immortal. His object was to regulate the manners as well as the government, and to form a warrior nation, in which no private interest should prevail over the public good. It is said that Lysurgus persuaded the Spartans to swear that they would observe these laws till his return from another journey, and that he then departed, and they never heard of him more. One account states that he starved himself to death, but it is more probable that he retired to private life, and died naturally, as Lucian records, at the age of eighty-five. A great number of the laws accredited to Lysurgus are known to have been common to the whole Doric stock from the earliest period.

Lydda (modern Ludd; Heb. *Lod*), a city of Palestine, in the Plain of Sharon, first mentioned in *Ezra*, ii, 33 and *Neh.* vii, 37. Under the Romans it was capital of a district of Judea. The town was occupied by the British in Nov., 1917.

Lyddite. See *Explosives*.

Lydenburg, a town of the Transvaal, South Africa; was established in 1847, and for eleven years the capital of a small independent Boer republic, which subsequently united with the Transvaal. It is near the gold-fields worked by the Portuguese, and reopened in 1873. Pop. 1500.

Lydia, an ancient and powerful kingdom of modern Asia Minor which extended eastward from the Egean to the River Halys, and comprised Paphlagonia (Black Sea littoral), Bithynia, Mysia (at the Dardanelles), Lydia Proper, Lycia, Phrygia, and part of Cappadocia. Sardis was the capital. The Lydians were a highly civilized people, improvers and inventors in music and metallurgy. Their kingdom attained its highest prosperity under the Mermnadæ dynasty (about 716 B.C.), and ended with Croesus (546 B.C.), who was conquered and Lydia annexed by the Persians under Cyrus.

Lydian-stone, a siliceous flinty slate, having the appearance of black velvet, found in many countries, but first brought from Lydia and used as a touchstone.

Lye, a term applied to the alkaline solutions of potassium or sodium hydroxides or carbonates. The former are termed 'caustic lyes', and are used mainly in soap-making; the latter are largely employed for scouring purposes, and for the removal of grease from metals and other substances.

Lyginodendron, a genus of Pteridosperms (q.v.), comprising some of the most interesting

of Carboniferous plants. *L. Oldhamii* had the general appearance of a large tree-fern, but bore genuine seeds (formerly known as *Lagenostoma*) of complicated structure, enclosed in a characteristic husk or cupule. The microsporangia (formerly called *Crossotheca*) were grouped on leaves which also bore barren leaflets.

Lygodium, a genus of tropical and temperate Ferns, family Schizaceæ. The plants twine by means of their mid-ribs, a rare feature in Ferns.

Lyly, John, English dramatist and writer, born about 1553, died 1606. He studied at Magdalen, Oxford, and at Cambridge, and attempted to reform and purify the English language in two romances entitled *Euphues, or the Anatomy of Wit* (1580) and *Euphues and his England* (1581). A specimen of Euphuism may be found in Sir Walter Scott's *Monastery*. Lyly's plays include *Endymion* (1591), *Alexander and Campaspe* (1584), and *The Woman in the Moon* (1583). Lylyesque comedy was imitated by Ben Jonson in *Cynthia's Revels*, and parodied by Shakespeare in *Love's Labour's Lost*. - Cf. J. D. Wilson, *John Lyly*.

Lyme-grass, the popular name of certain grasses. One species, *Elymus arenarius*, is a native of Britain. They are all coarse grasses.

Lyme-Regis, a municipal borough and watering-place of Dorset, England. The district is of geological importance. Lyme-Regis has a considerable export trade in cement. Pop. (1921), 2883.

Lymington, a municipal borough of Hampshire, England, a seaport and yachting centre. The town was long important in the salt trade. Pop. (1921), 4598.

Lymph is the tissue fluid found filling the spaces between the cells of the tissues of the body in a manner similar to a soaked sponge. The lymph may be regarded as part of the blood plasma which exudes through the walls of the capillaries, bathes all the tissues, and then passes into the network of small vessels called lymphatics. These gradually increase in size as they approach the thoracic duct, the main lymph channel, which is situated in the chest, and from which the lymph is returned to the blood system by entering the left internal jugular vein. The lymphatics in the abdominal cavity, known as lacteals, take the products of digestion which are absorbed through the wall of the intestine, and these are carried through the lymphatic system to the blood system to be finally distributed among the tissues. After a meal, during the process of absorption, the lymph appears milky, from the presence of minute particles of fat, but in a fasting animal the lymph is a transparent fluid of a slightly yellowish colour. All the lymphatics of the body at some point pass through the lymphatic glands, where leucocytes

are formed, and these leucocytes are carried by the lymph stream to the blood-vessels.

Lynchburg, an industrial and tobacco-exporting city of Campbell county, Virginia, United States, on the James River. It was founded by John Lynch in 1786, and first incorporated in 1823. Pop. (1920), 20,956.

Lynch-law, a term applied to any rough-and-ready method of administering mob-justice apart from the law. The term originated in the action of one, Charles Lynch (1736-96), a farmer of revolutionary convictions, who lived in Virginia, United States, and who supported his convictions by hanging up by the thumbs men of Tory politics until they cried out 'liberty for ever'.

Lynedoch (lin'dok), Thomas Graham, Lord, British general, born 1748, died 1843. Until 1792 he lived as a country gentleman, but when his wife died he entered the army as a volunteer, taking part in the retreat to Coruña, and the Walcote expedition. Appointed to command the forces besieged by the French at Cadiz, he gained the victory of Barossa (1811), joined Wellington's army, and engaged in the Peninsular War. He was present at Vittoria and at the siege of San Sebastian, and in 1814, after the unsuccessful siege of Bergen-op-Zoom, he was created Baron Lynedoch.

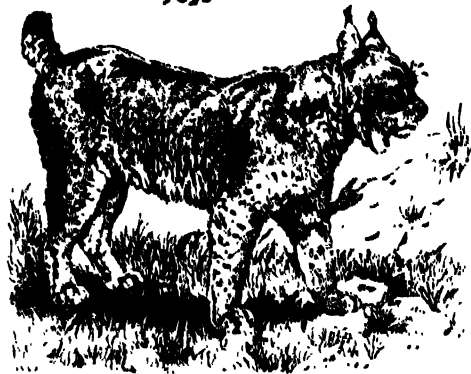
Lynn, a city of Essex county, Massachusetts, United States, on the north side of Massachusetts Bay. It is one of the principal boot-manufacturing centres of the world, and has also large electrical apparatus and factories.

Lynn Canal, a strait of Alaska, stretching 60 miles northwards from Adakally Island, and culminating in the Chilkat (west) and Chilkoot (east) inlets. It averages 6 miles in breadth. Skagway lies on the Chilkoot inlet, and is the terminus of the railway to the Klondyke. Chilkat, on the western arm, is a salmon-canning centre.

Lynn Regis, or **King's Lynn** as it is now always called, a seaport town and municipal borough of Norfolk, England, on the Wash. It is of considerable antiquity. The church of St. Margaret (1100) and the remains of a thirteenth-century Franciscan friary are prominent. There is a large transit trade, some manufactures, and coastal fishing. Pop. (1921), 19,068.

Lynx, the popular name of several species of feline carnivora, resembling the common cat, but with longer legs, ears longer and tufted with a pencil of hair, and tail shorter. The lynxes have been long famed for their sharp sight and their brilliant eyes. The common European lynx is the *Felis lynx*, while the pardine lynx (*F. pardina*) is native to Southern Europe. The Canadian lynx is the *F. canadensis*; the bay lynx, or American wild cat (*F. rufa*), is found in

Canada and the United States; and the plateau lynx (*F. baileyi*) is indigenous to Colorado,



Lynx (*Felis lynx*)

Utah, and Arizona. In Asia lynxes are famed for hunting. The fur is valuable.

Lyon King-of-Arms, or **Lord Lyon**, in Scotland (since 1370), the hereditary officer who presides over the Lyon Court. The Lyon Court is charged with the recording of pedigrees, settlement of disputes regarding precedence, the inspection of arms and ensigns-armorial of all Scottish noblemen and esquires, and the authorization of armorial bearings and their registration. The Registry of the Order of the Thistle is an office of the Lord Lyon.

Lyonnais (le-on-nâ), an ancient province of France, of which Lyons was the pre-Revolutionary capital. It now forms (approximately) the departments of the Rhône, Loire, Haute Loire, and Puy-de-Dôme.

Ly'ons (Fr. *Lyon*; Lat. *Lugdunum*), the second city of France in industrial importance, and the third in respect of population. It is the capital of the department of the Rhône. The town is built partly on a peninsula between the Saône and the Rhône, and partly on the opposite banks of the rivers on either side. The rivers are crossed by over a score of bridges, and the city is surrounded by a number of detached modern forts. Parts of the city are old, squalid, and unhealthy, but as a whole it has a stately and imposing appearance, and is finely seen from the Fourvière, an eminence on the right bank of the Saône, crowned by the church of Notre Dame, whence there is a most magnificent view extending to the Alps. Among the chief buildings are the cathedral, mostly of the thirteenth century, completed towards the end of the fifteenth century; the church of St. Martin d'Ainay, with a cupola supported by ancient Roman columns and a crypt believed to be of

the ninth century; the church of St. Nizier, a fine example of flamboyant Gothic; and the Hôtel de Ville (1646-55), considered the finest of its kind in France. In the archiepiscopal palace, situated near the cathedral, 1000 Protestants were butchered in 1572 as a sequel to St. Bartholomew. The public library has nearly 500,000 volumes. The chief educational establishments are a university, founded in 1834, a Roman Catholic college, a Lycée, a normal school, la Martinière, and a school of industrial arts. Lyons carries on various industries, but is the centre of the world's silk manufacture, which provides employment in the town and environs to about 240,000 people.

The origin of Lyons cannot be traced, but its foundation has been ascribed to Greek refugees. What is certain is that when Caesar invaded Gaul it had become a place of some importance. Towards the end of the second century it numbered thousands of Christians among its inhabitants. It was sacked by the Huns and Visigoths, and in the eighth century fell for a time into the hands of an army of Saracens from Spain, but recovered its prosperity under Charlemagne, on the dissolution of whose empire it became the capital of the Kingdom of Provence. In 1312, during the reign of Philip the Fair, Lyons was annexed to the Crown of France. During the Revolution the city suffered severely by the paralysis of its industry, and by the murderous excesses of the emissaries of the Paris Convention, whom the citizens had defied, the chief buildings being destroyed and many persons butchered. In 1916 the Lyons fair, which takes place twice annually, was founded in opposition to the Leipzig fair. Pop. (1911), 523,790.

Lyre, one of the most ancient stringed instruments of music, consisting of a body with two horn-like pieces rising from it, and a cross-piece between the horns, from which to the lower part

number was afterwards increased to seven, then to eleven, and finally to sixteen. It was played with the *plectrum* or lyre-stick of ivory or polished wood, also with the fingers, and was used chiefly as an accompaniment to the voice. The body of the lyre was hollow, to increase the sound.

Lyre-bird (*Menura superba*), a perching bird, somewhat smaller than a pheasant, native to New South Wales and South Queensland. The

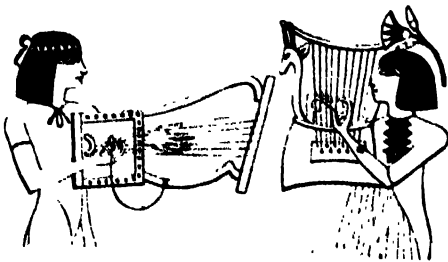


Lyre-bird (*Menura superba*)

tail of the male is remarkable for the three sorts of feathers that compose it, which by their shape and arrangement resemble the form of an ancient Greek lyre. It has a pleasing song, and is said to be capable of imitating the voices of other birds. The male has a 'play-ground', where he dances and struts. There are two related species, one (*M. alberti*) with a similar range; and the other (*M. victoriae*) found in Victoria.

Lyric Poetry was originally poetry adapted to the lyre and intended to be sung. The term was afterwards applied to short poems (whether meant to be sung or not), usually divided into stanzas, and directly expressing the poet's own thoughts and sentiments. The earliest recorded use of the expression 'lyric poets' is in Puttenham's *Arte of English Poesie* (1589). When the term was first used, it was considered helpful to classify poets and poetry with much accuracy, but the phrase 'lyric poetry' has now lost its exactness of meaning and much of its helpfulness. It may now be more accurately defined by saying that all poetry which is not quite definitely epic, dramatic, or didactic is lyric poetry.

Greece was the original home of lyric poetry. Amongst the greatest of the Greek lyric poets



Played with plectrum. Played with fingers.
Egyptian Lyres, from a wall painting at Thebes

the strings were stretched. It was used by the Egyptians, Assyrians, and Greeks. It is said to have had originally only three strings, but the

are Sappho, Alcaeus, Aleman, Simonides, and Pindar. If among names so great it is allowable to pick out the greatest, Sappho and Pindar may be picked out; their work has had and still has a powerful influence upon the development of lyric poetry. Nor was the writing of lyrical poetry confined in Greece to purely lyrical poets. Aeschylus's plays are lyrical dramas, and contain some of the noblest lyrical poetry in the world; and the lyrics of Aristophanes, particularly those in the *Birds* and *Clouds*, are unequalled, save by Shelley, for grace and lightness of touch. Among Roman poets Catullus proved himself the equal of Sappho, and Horace adapted the metres of Sappho and Alcaeus and reached great heights of poetry in his Roman odes.

To enumerate many of the modern writers of lyric poetry would be a long task, but a few of the greatest may be mentioned. Shakespeare and many of the other Elizabethan dramatists have written beautiful songs in their plays. Herrick may be mentioned as one of the most delightful of lyric poets; he had many contemporaries only slightly less great. Burns has perhaps the greatest range of any lyric poet. Shelley seems to be an incarnation of the spirit of lyric poetry, and among English poets stands nearest to the Greeks.

Among lyric poets of other nations may be mentioned Lamartine, V. Hugo, A. de Musset, A. de Vigny, and Verlaine in France; Leopardi and Carducci in Italy; Goethe, Schiller, and Heine in Germany; Pushkin in Russia; and Mickiewicz in Poland.—BIBLIOGRAPHY: F. Rhys, *Lyric Poetry* (Channels of English Literature Series); F. Brunetière, *L'Évolution de la Poésie lyrique en France*; G. R. Carpenter, *Outline Guide to the Study of English Lyric Poetry*.

Lys, a river rising in Pas-de-Calais, France, which runs through Belgium, and enters the Scheldt at Ghent; length, 100 miles. It formed the line of much fighting during the European War.

Lysander, an ancient Greek general, who was appointed to the command of the Spartan fleet off the coasts of Asia Minor in 407 B.C., during the Peloponnesian War. In 405 B.C. he defeated and captured the Athenian fleet off Ægospotami, and thus put an end to the war. He was killed in a battle with the Thebans in 395 B.C.

Lysias, an Athenian orator, born about 458 B.C. He studied philosophy and eloquence at Thurii in Magna Græcia, and was there employed in the government. On the defeat of the Athenians in Sicily he returned to Athens in 412, but was banished by the thirty tyrants. When the city recovered its freedom he returned in 403, and gave instruction in eloquence, also writing speeches for others to deliver. He died in 378.

Only about thirty of his numerous orations have been preserved.

Lysimachus, a general in the army of Alexander the Great, was born in Macedonia 360 B.C., and at the death of the emperor and the division of the empire he became King of Thrace. During the latter years of his reign he was instigated by his wife to kill his son Agathocles. This murder caused his subjects to rebel, and in the war which followed Lysimachus was defeated and slain at the battle of Corus in 281 B.C.

Lythraceæ, the loosestrife tribe, a natural order of polypetalous dicotyledons, containing about thirty genera of herbs, trees, and shrubs, of various habit, often with square branches; the leaves usually are opposite or whorled, entire, and shortly petiolate; the flowers being often large and showy. Henna and tulipwood belong to the order.

Lythrum, a genus of plants, the type of the ord. Lythraceæ (q.v.). *L. salicaria*, purple loosestrife, is a tall and handsome British plant. See *Heterostylism*.

Lyttelton, a seaport in the Canterbury District, New Zealand, connected by rail with Christchurch (7 miles via tunnel), of which it is the port. There is a good natural harbour and graving-dock. The exports are principally of wool and frozen meat. Pop. 4000.

Lytton, Edward George Earle Lytton Bulwer-Lytton, Baron, youngest son of General Bulwer of Woodalling and Elizabeth Barbara Lytton of Knebworth, was born 25th May, 1803, died at Torquay 18th Jan., 1873. He entered Trinity Hall, Cambridge, graduated B.A. in 1826, M.A. in 1835, and gained the chancellor's prize medal for his English poem on *Sculpture*. He published poetry at an early age, but first gained reputation by the novels *Pelham* and *The Disowned* (1828), *Devereux* (1829), and *Paul Clifford* (1830). These were followed by the popular romances of *Eugene Aram*, *The Pilgrims of the Rhine*, *The Last Days of Pompeii*, *Rienzi*, and *Ernest Maltravers* with its sequel *Alice*. In connection with Macready's management at Covent Garden Bulwer-Lytton produced his *Duchesse de la Vallière*, which proved a failure, but this was retrieved by the instant success of the *Lady of Lyons*, *Richelieu*, and *Money*. When he had thus shown his quick adaptability of talent he returned to novel-writing, and published in steady succession—*Night and Morning*, *Zanoni*, *The Last of the Barons*, *Lucretia*, *Harold*, *The Caxtons*, *My Novel*, and *What will He Do with It?* In 1845 he published a poetical satire called *The New Timon*, in which he attacked Tennyson, who replied more vigorously than had probably been expected. He entered Parliament for St. Ives in 1831, and supported the Reform Bill as a

Whig; but he changed his opinions and subsequently supported the Conservatives. Under Lord Derby's ministry he was Colonial Secretary, and in 1866 entered the House of Lords as Baron Lytton. He was elected rector of Glasgow University in 1856. His later literary works were *The Coming Race*, published anonymously (1871); *The Parisians* (1872); and *Kenelm Chillingly* (1873). Among his poetic works were the epic *King Arthur*; *The Lost Tales of Miletus*; and *Brutus*, a drama.—BIBLIOGRAPHY: T. H. S. Escott, *Edward Bulwer, first Baron Lytton of Knebworth*; V. A. G. R. Lytton, *The Life of Edward Bulwer, first Lord Lytton*; J. C. Watt, *Great Novelists*.

Lytton, Edward Robert Bulwer-Lytton, first

Earl of, son of the first Baron Lytton, was born in 1831; educated at Harrow and Bonn; entered the diplomatic service in 1849 as attaché at Washington; and successively served* in the embassies of Florence, Paris, the Hague, Copenhagen, Athens, Madrid, Vienna, Paris, and Lisbon. He was appointed Viceroy of India by Lord Beaconsfield in 1876, and during his administration the queen was proclaimed Empress of India, and war was waged with Afghanistan. In 1880 he resigned and was created an earl. He attained some reputation as a poet under the pen name of 'Owen Meredith'; and wrote *Cytemnestra and other Poems*; *Lucile*; *Tannhäuser, or the Battle of the Bards*; *Fables in Song*; *King Poppy*; and *Glenavril*; besides prose works.

M

M is the thirteenth letter and tenth consonant of the English alphabet. It represents a labial and nasal articulation, the compression of the lips being accompanied with the fall of the uvula so as to allow the voice to form a humming sound through the nose, which constitutes the difference between this letter and *b*.

Maartens, Maarten, the pen-name of Joost Marius van der Poorten Schwartz, novelist, born at Amsterdam in 1858, and died in 1915. He was educated in England, at Bonn, and the University of Utrecht. He wrote several novels in English, notably *The Sin of Joost Avelingh* (1890), *God's Fool* (1892), *The Greater Glory* (1894), *My Lady Nobody* (1895), and *Dorothea* (1904).

Macad'arn, John Loudon, Scottish inventor, was born at Ayr 1756, and died in 1830. In 1815 he was appointed surveyor of the Bristol roads, and was so successful in this that the House of Commons presented him with a sum of £10,000. His system of road-making is still known as Macadamization, and consists in covering the roadway or forming the road-crust with small broken stones to a considerable depth, and consolidating them by rollers, so as to form a hard, firm, and smooth surface.

Macao, a Portuguese settlement and city of China, on the Island of Macao at the mouth of the Canton River, and forming, with the adjacent islands of Taipa and Colôane, a province. Macao has been a Portuguese colony since 1577, but was not formally recognized as independent of China until 1887. Area, about 10 sq. miles.

Macaronic Poems, a kind of facetious Latin poems, in which are interspersed words from other languages, with Latin inflections. They were first written (at least with the above designation) by Teófilo Ekenko (1491-1544); and were introduced into England in the reign of

Henry VII. Drummond of Hawthornden is credited with a macaronic poem, *Polemo-Middinia*, published in 1664. There is good reason, however, to believe that it is later than Drummond's time, and that it is the work of Dr. Pitcairne (1652-1713). Another specimen of macaronic verse is J. R. Lowell's *Kettelopomachia*.

Macas'sar, a seaport town of Celebes (q.v.), Dutch East Indies, on Macassar Strait, and second only to Batavia in commercial importance. It was made a free port in Dec., 1846, and now exports spices, Macassar oil, rubber, and valuable woods. Pop. about 20,000.

Macaulay, Thomas Babington, Lord, historian, essayist, and politician, born 1800 at Rothley Temple, Leicestershire, and died at Kensington 1859. In 1818 he entered Trinity College, Cambridge, where he obtained the chancellor's medal for a poem on *Pompeii*, and a second time for a poem on *Evening*; received a fellowship, and took his M.A. degree in 1825. Before this he began to contribute to Knight's *Quarterly Magazine*, in which appeared his poems of the *Armada*, *Ivy*, and *The Battle of the League*; and in 1825 he published in the *Edinburgh Review* his article on Milton. He was called to the Bar at Lincoln's Inn in 1826, and entered Parliament in 1830 as member for Calne. He afterwards became member for Leeds, but resigned his seat and proceeded to Calcutta as legal member of the Supreme Council of India, in which position he prepared a new penal code that was not adopted because of its liberal dealing with the native races. Returning from India, he was elected a member of Parliament for Edinburgh; was made Secretary of War in the Melbourne ministry (1839-41); and when the Whigs returned to power in 1846, he was

appointed Paymaster of the Forces. At the election of the same year his Edinburgh constituency refused to re-elect him, but their attitude was reversed in 1852, when he was returned (although he had not presented himself as a candidate). During his political career Macaulay had continued to write. In 1842 he published his *Lays of Ancient Rome*; and in 1848 appeared the first two of the five volumes of his *History of England*, which covers the period between the accession of James II and the death of William III. This work, although touched with partisanship and with a tendency to paradox, has attained the position of an English classic. He was created a peer in 1857, and at his death he was buried in Westminster Abbey. — BIBLIOGRAPHY: Sir G. O. Trevelyan, *Life and Letters of Lord Macaulay*; J. A. C. Morison, *Macaulay* (English Men of Letters Series); D. H. Macgregor, *Lord Macaulay*.

Macaw', the name of beautiful parrots native to tropical America. The macaws are magnificent birds, distinguished by having their cheeks destitute of feathers, and their tail-feathers long. The largest and most splendid in regard to colour is the great scarlet or red-and-blue macaw (*Ara chloroptera*). The great red-and-green macaw (*A. militaris*) and the blue-and-yellow macaw (*A. ararauna*) are somewhat smaller. The hyacinthine macaws (species of *Anodorhynchus* and *Cyanopsittacus*) of Brazil are blue.

Macbeth', son of Finlloch and nephew of Malcolm II, a king of Scotland who reigned from 1040 to 1057. He was hereditary mormaor of Moray, and slew King Duncan at Bothgowan, near Elgin, in 1040, when he proclaimed himself king. In 1050 he is said to have gone on a pilgrimage to Rome. At the death of their father the sons of Duncan had taken refuge with their uncle Siward, Earl of Northumbria, and with his aid they invaded Scotland in 1054; a battle was fought at Dunsinane, but it was not until 1057 that Macbeth was finally defeated and slain at Lumphanan, in Aberdeen. The legends which gradually gathered round the name of

Macbeth were collected by John of Fordun and Hector Boece, and reproduced by Holinshed in his *Chronicle*, where they were found by Shakespeare.

Mac'cabees, a dynasty of ruling Jewish priests of whom the first who came into prominence was Mattathias. During the persecutions of Antiochus Epiphanes he slew a Jew who came to the altar to renounce his faith, and then fled to the mountains with his five sons — Johannes, Simon, Judas, Eleazar, and Jonathan. Being joined by numerous patriotic Jews, they were able to make successful resistance to the national foe and re-establish the ancient religion. When Mattathias died (166 B.C.), his sons Judas and Jonathan became successively leaders of the national movement. The last remaining member of the family was Simon, who now carried forward the national cause to a triumphant issue, reduced 'the tower' of Jerusalem, and established the power of the new state. Under his rule trade and agriculture flourished, until (in 135 B.C.) he was treacherously murdered by Ptolemy, his own son-in-law. Cf. E. Schürer, *History of the Jewish People*.

Maccabees, two books associated with the Old Testament, treating of the Jewish history under the Maccabean princes. They are included in the English *Apocrypha*. *1st Maccabees* is of historical value.

McCarthy, Justin, novelist, historian, and politician, born at Cork 1830, died 1912; became connected with the *Live-pool press* in 1853; joined the staff of *The Morning Star* in 1860, and became its chief editor in 1864. He afterwards was connected with *The Daily News* (1870-85). His novels are numerous, and his historical writings include *A History of Our Own Times* and *History of the Four Georges*. He was chairman of the Anti-Parnellite section of the Irish National party from the fall of Parnell in 1890 to 1896.

MacClellan, George Brinton, American general, born at Philadelphia 1826, died 1885. In 1855 he was appointed to the Commission reporting upon the condition of European armies, and watched the military operations during the Crimean War. At the outbreak of the Civil War in the United States he superseded McDowell after the first battle of Bull Run, and became commander-in-chief on 1st Nov., 1861. In this capacity he organized the raw levies of the North and advanced against Richmond the following spring, but was relieved from supreme command by President Lincoln in 1862, and thenceforth led the army of the Potomac. When Lee advanced into Maryland, MacClellan fought the battles of South Mountain and Antietam (14th-17th Sept., 1862), and compelled the Confederate forces to retire. The political authorities being dissatisfied with his apparent slowness in following up this victory, Mac-



Blue-and-yellow Macaw
(*Ara ararauna*)

Clellan was relieved from his command and retired from the army. In 1864 he was nominated for the presidency, but was overwhelmingly defeated by Abraham Lincoln.

Macclesfield, a town of Cheshire, England. The staple manufacture is silk. In the vicinity are extensive coal-pits and stones and slate-quarries. Pop. (1921), 17,047.

MacCulloch, or **McCulloch**, Horatio, R.S.A., one of the most distinguished of Scottish landscape-painters, was born in Glasgow in 1806, died near Edinburgh 1867. From 1831 he was a regular contributor to the exhibitions of the Royal Scottish Academy, Edinburgh. His paintings are nearly all of Scottish scenery. Among the most celebrated are the *Cuchulinn Mountains* (Skye), *A Dream of the Highlands*, *Highland Loch*, *Views in Cadzane Forest*, *Loch-an-Eilan*, *Mist on the Mountains*, *Loch Achray*, *Loch Katrine*, and *Loch Lomond*.

Macdonald, Étienne Jacques Joseph Alexandre, Duke of Taranto and Marshal of France, was born in 1765, and died 1840. He was closely related to Flora Macdonald, and belonged to a Jacobite family exiled for their support of James II. Entering the French army, he served with an Irish regiment, but early espoused the Revolutionary cause, and in 1796, after his capture of the Dutch fleet (1795), he became general of division. Napoleon made him Governor of the Roman States (1798), and in 1809 he broke the Austrian centre at Wagram and was made a duke and marshal on the field. Macdonald was loyal to Napoleon until the last eventful days of abdication and exile, and although he was made a peer by the Bourbons at the Restoration, he refused to take part against Napoleon in the Hundred Days. From 1816 onwards he was Chancellor of the Legion of Honour.

Macdonald, Flora, born at Milton, South Uist (Outer Hebrides), in 1720, died 1790. She became celebrated in 1740 for the part she took in assisting Prince Charles Edward to escape the Government pursuit after Culloden, when she conveyed him from South Uist to Skye, disguised and in an open boat. For this she was imprisoned in the Tower of London, but was released in 1747. She married, settled in North Carolina, but afterwards returned to and died in Skye.

MacDonald, George, novelist and poet, was born at Huntly 1824, died 1905. He was educated at King's College, Aberdeen, became an Independent minister, but soon retired from this position and adopted literature as a profession. Among his numerous novels are: *David Elginbrod*, *Alec Forbes*, *Annals of a Quiet Neighbourhood*, *Robert Falconer*, *Malcolm*, *The Marquis of Lossie*, and *Castle Warlock*. He also published some poetry, and stories for the young.

Macdonald, Sir John Alexander,^o Canadian statesman, was born in Scotland 1815, died 1891. Being taken to Canada, he was educated at Kingston; admitted to the Bar in 1835; entered Parliament for Kingston in 1844; and became successively a member of the Executive Council, Receiver-General, Commissioner of Crown Lands, and Attorney-General. He became Premier in 1867, a position which he held until 1873, when he resigned over the Pacific Railway charges, but resumed the office again in 1878, and held it till his death. He was leader of the Conservatives.

Mace, a weapon of war in use in Europe as late as the sixteenth century. It consisted of a staff about 5 feet long, with a heavy metal head, which assumed a variety of forms, but was frequently in the form of a spiked ball. Another kind of mace is a sort of heavy ornamental staff used as an emblem of authority in universities and courts of law. In the House of Commons it is the symbol of the Speaker's authority, and is removed from its place on the table when the Speaker leaves the chair or the House rises.

Mace. See *Nutmeg*.

Macedonia, in ancient geography, a territory lying north of Greece, which first became powerful under its king, Philip, father of Alexander the Great and conqueror of Greece. Alexander added immensely to the Empire of Macedonia and made it mistress of half the ancient world. After his death the empire was partitioned, dominion over Greece was lost, and the battles of Cynoscephale (197 B.C.) and Pydna (168 B.C.) reduced the ancient kingdom to a Roman province. In the fifteenth century Macedonia fell under the sway of the Turks, and, being inhabited by Greeks, Turks, Bulgarians, and Serbians, it was the scene of many revolts. It is now divided among Greece, Bulgaria, and Yugoslavia.

Maceió (mã-sũ'i-o), a seaport and, since 1839, capital of the state of Alagoas, Brazil, at a short distance from Jaraguá, its port on the Lagoa do Norte, and connected by rail with Pernambuco. Cotton and machinery are manufactured. Pop. (1920), 68,000.

Macenta, a territory of West Africa, forming, with others, the colony of French Guinea.

Macerata (mu-che-rã'tà), a maritime province



Mace of House of Commons

of the *Marches*, Central Italy, traversed by the Roman Apennines and lying around the valleys of the Potenza and Chiente. Area, 1070 sq. miles; pop. about 270,000.

Macerata, a city of Italy, and capital of Macerata Province, founded with Recanati immediately after the destruction of *Helvia Ricina* by Alaric (408), where there are ruins of an amphitheatre. The State university was founded in 1290. Pop. about 24,000.

Macfarren, Sir George Alexander, musical composer, born in London 1813, died 1887. He became a member of the Board of the Academy, and ultimately chairman and principal; was elected professor of music, Cambridge University (1873); and was knighted in 1883. His chief operas are: *The Devil's Opera* (1838), *Don Quixote* (1846), and *Robin Hood* (1860). He also essayed the cantata in *Lenore* (1852) and *The Lady of the Lake* (1870). His oratorios are: *St. John the Baptist* (1873), *The Resurrection* (1876), *Joseph* (1877), and *King David* (1883).

Macgillcuddy's Reeks, a mountain range of County Kerry, Ireland, extending for 13½ miles west of Killarney. Carruntuil, the highest peak, rises 3414 feet above sea-level.

McGill University, a Canadian university, founded in 1821, which originated in an endowment of James McGill (1744-1813), a Scottish merchant in Montreal. There are the McGill, Macdonald, and Royal Victoria Colleges, the last named being for women.

Machiavelli (māk-yā-vel'le), Niccolò, Italian statesman and historian, born at Florence 1469, died 1527. In 1498 he was appointed secretary to the Ten at Florence, and for more than fourteen years he guided the destinies of the Florentine Republic, undertook embassies, concluded treaties, and jealously conserved the rights and liberties of his native city. When, by aid of Pope Julius II, the Medici returned to power in 1512, Machiavelli was deprived of his office, and imprisoned for his supposed complicity in a plot to overturn the new authority; but being released after a time, he retired to his country house of San Casciano. Here he devoted himself to literature and produced a *History of Florence*, embracing the period between 1215 and 1492; *Discourses upon the first ten books of Livy*; *The Prince* (*Il Principe*), by which he is best known; a military treatise entitled *Dell' Arte della Guerra*; and the comedies of *La Mandragola* and *La Clizia*. *The Prince* was first published in 1532 by permission of Pope Clement VII. Machiavelli made a clear distinction between ethics and politics, and he has been followed in this conception by numerous statesmen in modern times, who never allow objection on ethical grounds to interfere with their political and diplomatic schemes.—BIBLIOGRAPHY: Cam-

bridge *Modern History* (vol. i); L. Villari, *Machiavelli and his Times*; J. M. Robertson, *Pioneer Humanists*.

Machine Design concerns not only the selection of a suitable mechanism to perform any specified mechanical action, but also the determination of the stresses to which the parts are subjected; for these stresses must be known before the dimensions required for safety can be assigned. When metals are loaded, a change of form takes place gradually and proportionately until the *elastic limit* is reached, when the deformation becomes more marked. After loading to this extent a *permanent set* is shown. In any actual machine the designer must select sections of such proportions as to prevent actions of this character. Even when material is subjected to stresses of a lower value than the elastic limit, either on and off or acting in tension and compression alternately, the material becomes *fatigued*, and rupture takes place after a number of repetitions. To avoid these possibilities, as well as to allow for any irregularities in the material, a *factor of safety* is introduced into the calculations. It is the ratio of the ultimate strength of the material to the working load it is called upon to bear. The value of the factor of safety varies considerably, according as the load is *dead*, i.e. steady, or *live*, i.e. alternating. In the main calculations for any machine, whether it be a shearing machine or a steam-engine, the loads on the essential parts can be calculated from the work to be done. If these loads act as simple stresses, the cross-sectional areas are obtained by dividing the load by the allowable stress. The stresses to which a machine part is subjected are frequently of a combined character, such as tension and twisting or tension and bending, and in these cases the resultant stress due to both actions must be considered. In many examples the stresses are indeterminate, and former experience then enters largely into the selection of a suitable section. Common details of machines have been standardized, and the relationship of their dimensions is given in the textbooks in terms of some standard, such as the diameter of a shaft, bolt, or rivet. This simplification of the machine-designer's work is based on a combination of experience of the nature of trial and error, consideration of appearance, and scientific principles. Many empirical equations are used in design work which, as the accumulation of knowledge of stress actions grows, are seen to be based on fundamental principles.—BIBLIOGRAPHY: H. J. Spooner, *Machine Design, Construction, and Drawing*; W. C. Unwin and A. L. Mellanby, *Elements of Machine Design*.

Machine-gun, a small-calibre fire-arm arranged to fire from a stand, carriage, or tripod,

and provided with mechanical devices calculated to produce a very rapid rate of fire. Stands or rests, or even carriages, are necessary, partly on account of the weight and partly to increase the stability required for rapid and continuous fire. Machine-guns in use in the British army are the

'Vickers' the 'Hotchkiss' and the 'Lewis' (q.v.), of which the first is the machine-gun *par excellence*, the other two being, in some degree, of the nature of automatic rifles. Speaking generally, there are two main classes of machine-guns, i.e. those which depend principally on the shock of discharge or recoil for their action, and those in which the gases generated by the explosion are controlled in such a way as to give the same effect. In both classes a powerful spring is also used to counteract the backward movement caused by recoil or action of gas. The modern Vickers gun is a recoil-action weapon, while the Hotchkiss and Lewis come under the gas-action category.

For all practical purposes machine-guns did not exist before 1862, in which year the 'Gatling' gun (q.v.) appeared in America. Then, just before the Franco-German War, the French authorities began experimenting with a machine-gun invented by a Belgian (see *Mitrailleuse*). In the British service, both naval and military, the first machine-gun to be adopted was the Gatling .45 calibre, and then came in rapid succession trials of the 'Nordenfeldt' and 'Gardner' guns. All these guns were of the multi-barrel type, i.e. they were constructed with from two to ten barrels, or even as many as thirty-seven. These guns were worked by a lever or handle. Then, in the early 'eighties, Mr. (afterwards Sir) Hiram Maxim invented a very much superior weapon to any that had previously appeared, a weapon, moreover, which with modifications and improvements held its own for many years, and of which the present Vickers gun is the lineal and improved descendant.

As we have seen, all former guns depended for their action on the elementary idea of turning a handle, and no automatic aids were made use of. Maxim broke new ground, and, instead of ignoring or counteracting the recoil present to a greater or less extent in every gun at the moment of discharge, harnessed it to his will, and made use of it to keep his mechanism running and his gun firing. He also abolished the collection of barrels and used only a single one, which, together with certain portions of its attached mechanism, he made movable. The effect of this was that when a cartridge was fired the barrel and the movable portion attached to it was forced back by the power of the recoil, the 'extracting' and 'reloading' mechanism being brought into play at the same time. Having reached the farthest limit of

recoil, a powerful spring, known as 'the fusee spring, took charge and forced the movable portion back to its original position, at the same time causing the loading device to complete its work and the firing-pin to reach the new cartridge. Once the gun was loaded and fired, it was only necessary to maintain the pressure on the trigger, by means of a double button, to secure a continuous stream of bullets up to a maximum of 700 a minute. Stoppages did of course occur, but these were soon recognized and provision for their rapid adjustment made, and as the gun was improved these became less frequent. The loading is by means of a belt, in which cartridges are held, passing through a 'feed block' operated by the moving portion of the mechanism.

The present Vickers gun resembles the original Maxim in its main features, but embodies many improvements suggested by experience; it is also considerably lighter, which is an additional advantage. In the Vickers, as in the original Maxim, the barrel proper is encased in a water-jacket to counteract the undue and excessive heating of the barrel which inevitably results from the rapid firing of hundreds of rounds. All machine-guns use the ammunition which is used in the ordinary rifles of the army concerned. The Maxim principle has been adopted by a very large number of countries, including Germany, where the value of the machine-gun was so well recognized that on the outbreak of the European War the German army took the field with thousands of these weapons, whereas in our army the allotment was merely two to a battalion. Now all this has been changed, and each battalion has thirty-two Lewis guns and a proportion of the heavier Vickers, which are also the arms of the separately organized machine-gun battalions. With regard to the tactical use of machine-guns, it must suffice to say that it has long been recognized that the true rôle of this weapon is not that of artillery. The French in 1871 used them in this way, forming their artillery brigades of two batteries of ordinary guns and one of mitrailleuses, with the inevitable result that the unfortunate machine-guns were out-ranged and smothered by the opposing artillery proper. The rôle of the machine-gun is the rôle of the small-bore arm, in which sphere it is highly efficient, both in taking its own considerable share in an attack and other operations and in providing covering-fire for advancing bodies of troops. See *Fire Tactics; Hotchkiss; Lewis Gun; Mitrailleuse*.—Cf. Longstaff and Atteridge, *Book of the Machine-gun*.

Machines, Theory of. A machine is a combination of parts whose motions relative to one another are restricted to achieve the purpose of transmitting or transforming mechanical energy.

The old system of classification of machines subdivided them into the so-called *mechanical powers* — the lever, the wheel and axle, the pulley, the inclined plane, the wedge, and the screw. All these types are better included in the two divisions of levers and inclined planes. The *Principle of Work* states that if friction be neglected the work put into a machine is equal to the work taken out. As work is the product of force and the distance through which it operates, if the force applied to the mechanism is increased to achieve the purpose of the machine, then the distances travelled by the parts in question will be decreased in the same ratio. The *mechanical advantage* is the ratio of the load to the effort.

Reuleaux introduced the system of discussing machine problems by reference to certain standard combinations of parts or *pairs*. These may be rated as *higher* or *lower* according to their simplicity. The *lower pairs* are (a) *sliding*, as the piston and cylinder; (b) *turning*, all pin joints; and (c) *screw*, all nuts and screws. *Chains* in the machine sense are made up of three or more *links* consisting of two *pairs*. The slider-crank mechanism is the simplest of all the kinematic chains, and is the essential mechanism of the direct-acting engine. By fixing the different links in turn, although the relation of the parts remains the same, mechanisms which serve different purposes can be obtained. Thus Scott-Russell's straight-line motion and the Whitworth quick-return motion are obtained from the same slider-crank combination as the steam-engine. The *higher pairs* concern examples of line or point contact, and include spur gearing (see *Gearing*), bevel gearing, friction drives, cams (q.v.), and escapements (q.v.) as *rigid links*; and rope, chain, and belt pulley drives as *flexible links*. The kinematic chains are combinations of lower pairs, as in the crank and screw chains, or of higher and lower pairs in pulley, wheel (constant motion), cam (variable motion), or ratchet chains (intermittent motion). The use of such a classification reduces the number of different mechanism problems to a few standard types. In spur- and bevel-gearing pairs the teeth are formed to transmit perfectly uniform motion. To fulfil this condition the normals to all surfaces of contact must pass through the meeting-point of the pitch lines (see *Gearing*).

With belt drives there must be a tight and slack side, and the relationship of these tensions is fixed by the coefficient of friction between belt and wheel and the angle embraced by the belt. Much experimental work has been done to determine the laws of friction (q.v.) under different conditions. There is an essential difference between the friction of two dry solids and the same bodies when lubricated. The first type, *solid friction*, varies directly with the

pressure, is independent of the surface, and at moderate speeds is independent of the velocity. *Fluid friction* is independent of the pressure, varies directly with the wetted surface and with the velocity raised to a power which increases with the speed. By the introduction of fluid lubricants between bodies in relative motion the friction is changed from the solid to the fluid type, and is considerably reduced in magnitude. Rolling friction, as in ball and roller bearings, is also less than the simple, solid, sliding type, and is not much diminished by lubrication. Belt drives can be arranged between shafts which are not parallel to one another if the side of the belt advancing towards the pulley is at right angles to the shaft. Where the drive is difficult or impossible otherwise, small jockey or idle pulleys may be introduced with success. Chain driving with pitch chains gives a *positive* drive, with which it is possible to transmit considerable power. Friction is made use of in all forms of locomotion between the vehicle wheels and the track, in clutches (see *Friction Clutch*), and in brakes used on winding engines, on vehicles, and in testing. The efficiency of a machine is the ratio of the work got out of it to the input (see *Efficiency*). Frictional losses account for the work loss in a machine, the energy lost for useful purposes being converted into heat.

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Machine Tools, all machines used in engineering work to shape material, usually iron or steel, into simple geometric forms. The tools used before James Watt's day were few in number and type, simple in construction, and crude in the quality of their work. In one of his letters Watt remarks that several cylinders have been bored "almost without error", and shows what he meant by that expression by going on to say that a cylinder 50 inches in diameter "did not err the thickness of an old shilling". The development of the steam-engine necessitated improved tools, both for the construction of the engine and for more efficient use of its power. Progress has continued until to-day the number and variety of machine tools is so great as to make classification difficult. In a rough way they may be divided into two groups: those in which the essential motion is rotation, and those in which it is a reciprocating motion, but the border is very indefinite.

Rotary Group.—The earliest machine tool was the simple turning lathe. Great credit is due to Henry Maudslay (1771-1831) for his pioneer work in developing the essential mechanism of the engineer's self-acting lathe. A lathe provides the means of rotating a billet against a fixed

tool so that material can be cut from it until it attains the desired size. The headstocks are the parts of the machine between which the billet is held. The slide rest carries the tool holder, and can be moved along the lathe bed by means of the lead screw which runs along the front of the frame. There are screws to move the tool holder in two directions at right angles to one another. A general tool employed for turning, boring, surfacing, and screw-cutting is used in tool-rooms and also in small general engineering works. The last illustration (fig. 11) on the plate shows a 12½-inch centre lathe of the type made by John Lang & Sons, Johnstone. The drive from a separate electric motor or from the works shafting is taken to the step cone through a countershaft. The various steps of the cone are used in combination with the gearing to obtain suitable speeds of rotation for the billets. The lathe shown is provided with a gap, so that flat faces of large diameter may be turned. The lead screw is driven by the headstock spindle through change wheels, by changing which the relative speeds of spindle and screw may be varied. In this way threads of various pitches can be cut with the use of one guide screw. In some lathes there are complete gear boxes fitted so that the removal and replacement of change wheels is unnecessary, the requisite gear change being effected by the simple movement of a lever. Messrs. John Lang & Sons manufacture a variable speed gear for lathe headstocks (fig. 10), consisting of two cones on long shaft and spindle. The one pair is driven from the other by the edges of a special belt. The relative speeds of the two shafts are altered by bringing together or separating the cones. The lever system makes one pair close up as the other pair opens out. The simple, non-screw cutting lathe has many varieties. Shafts, gears, pulleys, wheels, tyres, crank shafts, turbine rotors, and motor-car engine pistons all present differences in turning requirements. Economic and rapid production demands that machines should, almost without exception, be designed for a single purpose. There are thus innumerable varieties of lathe beds, headstocks, chucks, and centres. The large lathe shown in fig. 2 was designed for turning steam-turbine rotors. It is about 40 feet long, and has a double slide bed 12 feet across. The face plate is a strong and rigid casting with four heavy forged-steel jaws, moved by screws. This lathe is operated by two motors, a main one of 80 h.p. driving the spindle, and an auxiliary one of 25 h.p. driving the tool saddles. The production of short articles of a simple form from long bars is standard practice. In this work a lathe is used which has a hollow mandrel and an automatic chuck. The capstan or turret (see fig. 1) is a device for holding the various

tools, usually five or six, required in the work. These tools are brought into action in turn until the cycle of operations is complete. Automatic machines requiring no attention, except the provision of fresh bars, are used in the manufacture of standard bolts, studs, and other small parts. The capstan is moved by mechanism just after each stage is completed. The finished parts are cut off from the bar by the machine and new material pushed into place. Modifications of the lathe which permits a number of different operations without resetting, such as surfacing, boring, milling, drilling, and tapping, save a considerable amount of time in a machine shop. A machine of this character made by George Richards & Co., of Broudeheath, (fig. 3) has two tables; the upper one can be revolved or detached, and the lower one slides on a saddle of considerable length. This system of tables makes possible all the adjustments requisite to carry out a great number of different operations on the work.

The sensitive drill is a tool with which small holes, say up to about 1 inch diameter, are drilled. The drill is driven by belts over jockey or guide pulleys. The term sensitive is used because, the feed being by hand, any unusual difficulty in drilling is felt. A radial drilling machine is different from a sensitive drill in that the feed motion is given by gears and the drill can be altered in position along the radial arm. In many cases it is easier to adjust the drill to the hole centre than to move a heavy casting back and forward until its proper position for drilling is obtained. If a number of holes in a line are to be drilled, the radial arm can be set parallel to their centres and the drill saddle moved from centre to centre. A high-class machine of this character, provided with a change speed-gear box in which the wheels run

oil, is shown in fig. 7. The elevating arm is of box section, and is adjusted by power. The saddle is carried on rollers. The spindle is driven by gearing through a powerful friction clutch, and can be reversed for tapping. Milling is the term applied to machining surfaces by means of cylindrical cutters with a number of teeth. The work is fixed to a table and carried under the cutter by motion obtained from the gearing. The milling tool is carried on a shaft which is driven by a headstock at its one end and supported by vertical brackets and arms suspended from the overshaft.

The greatest development in modern engineering practice is found in the use of grinding machinery. Machine parts are now roughly machined and ground to gauged dimensions. Grinding machines are of the lathe form with a driven grinding wheel in place of the ordinary tool. The wheels are made of emery, carbor-

spiny-finned fishes (Acanthopteri), a well-known and excellent table fish, which inhabits almost the whole of the European seas. Mackerel, like herring, are caught only when they approach the shore to spawn, nets being chiefly used. Related species are the southern mackerel (*S. pneumatophorus*) and the Spanish mackerel (*S. colias*).

M'Kinley, William, President of the United States from 1897 to 1901, born at Niles, Ohio, 1843, died in 1901. In 1861, on the outbreak of the Civil War, he enlisted as a private soldier, and served till the end of the war, when he had attained the rank of major. After this he studied law, and started in practice at Canton, Ohio, in 1867. In 1876 he was elected to Congress, where in 1889 he became chairman of the Ways and Means Committee and Republican leader in the House. In 1890 he was associated with the M'Kinley Tariff Bill, a protective measure, and in 1891 was elected Governor of Ohio. In 1896 M'Kinley was nominated Republican candidate for the presidency, having as his opponent W. J. Bryan, an advocate of free silver coinage, and was elected by a large majority. He was re-elected in 1900, but on 6th Sept., 1901, he was shot by an anarchist at Buffalo, and died eight days later. He was succeeded by Vice-President Roosevelt.

M'Kinley, Mount, the highest peak of North America, in Alaska, near the Arctic Circle. Height, 20,464 feet. It was first ascended by Archdeacon Stuck in 1913. **BIBLIOGRAPHY:** H. C. Parker, *Conquering Mount McKinley*; Dr. H. Stuck, *Ascent of Denali*.

Maclaurin, Colin, Scottish mathematician, born 1698, died 1746. He studied for five years at Glasgow University, and was professor of mathematics at Aberdeen, and afterwards at Edinburgh. As a geometer and analyst he is of the first rank, and he is the only British mathematician of the eighteenth century fit to be placed on a level with the great Continental mathematicians of that period. His *Treatise on Fluxions* develops Newton's method of presenting the calculus, and contains a famous geometrical treatment of the attraction of ellipsoids. 'Maclaurin's method' of tracing a conic is given, as an example of a remarkable theory of curve generation, in *Geometria Organica*. In 1740 Maclaurin divided with Euler and Daniel Bernouilli the prize of the French Academy for an essay on the tides. -Cf. W. W. R. Ball, *A Short History of Mathematics*.

Maclaurin's Theorem, a formula for the expansion of a function in ascending powers of the independent variable, first given by Colin Maclaurin (q.v.). If $f(x)$, or y say, is a function of x , its derivative dy/dx (see *Calculus*) may be denoted by $f'(x)$. This derivative has itself a derivative, which is called the second derivative

of $f(x)$, and is denoted by d^2y/dx^2 , or $f''(x)$. Similarly the third derivative of $f(x)$ is d^3y/dx^3 , or $f'''(x)$, and so on. The values of $f(x)$ and its successive derivatives, as thus defined, for $x = 0$ are written $f(0)$, $f'(0)$, $f''(0)$, ..., $f^{(n)}(0)$, Maclaurin's Theorem is then

$$f(x) = f(0) + xf'(0) + \frac{x^2 f''(0)}{(1 \cdot 2)} + \frac{x^3 f'''(0)}{(1 \cdot 2 \cdot 3)} + \dots$$

the number of terms in the series being, in general, infinite. Nearly all the expansions of elementary algebra and trigonometry are special cases of this theorem. One of the most important examples is the *Binomial Theorem*

$$(1+x)^n = 1 + nx + \frac{n(n-1)x^2}{(1 \cdot 2)} + \frac{n(n-1)(n-2)x^3}{(1 \cdot 2 \cdot 3)} + \dots,$$

the series terminating when n is a positive integer, and converging for other values of n when x lies between 1 and -1. Other examples are the expansions quoted in the article *Function*. See *Taylor's Theorem*. - **BIBLIOGRAPHY:** F. F. P. Bisacre, *Applied Calculus*; G. A. Gibson, *Elementary Treatise on the Calculus*.

Macleod (ma-klood'), Norman, a minister of the Church of Scotland, born at Campbeltown, Argyshire, 1812, died at Glasgow 1872. Educated at Glasgow, Edinburgh, and in Germany, he became minister first of Loudon and then of Dalkeith, when he published his first work, entitled *The Earnest Student*, and became editor of the *Edinburgh Christian Instructor*. In 1851 he became minister of the Barony parish, Glasgow. Besides his untiring interest and labours in connection with the general work of the Church, and in various philanthropic movements, he became editor of *Good Words* in 1860, in which he published his stories of *The Old Lientenant and his Son*, *The Starling*, *Wee Davie*, and *A Highland Parish*. In 1867 he visited India, and the results of this journey appeared in his *Peeps at the Far East*. In 1869 he was elected moderator of the General Assembly of the Church of Scotland.

Maclise, Daniel, Irish painter, born at Cork 1811, died 1870. In 1833 he established his reputation with his picture *Snap Apple Night*. He became a member of the Royal Academy in 1840. Maclise was commissioned to paint for the new Houses of Parliament, and produced *The Spirit of Chivalry*, *The Spirit of Religion*, and the two great paintings of *The Meeting of Wellington and Blücher after Waterloo* and *The Death of Nelson* (1858-64). Among his best-known pictures are: *Merry Christmas in the Baron's Hall*, *The Ordeal of Touch*, *The Marriage of Strongbow and Eva*, *The Play Scene in Hamlet*, *The Banquet Scene in Macbeth*, and *Malvolio and the Countess*. His sketches, book illustrations, humorous drawings, and outline portraits were

very numerous. He declined the presidency of the Academy in 1866. The works of Maclise show great fertility of invention, skill in composition, and excellence in drawing, but are not distinguished for colour.

MacMahon, Marie Edmé Patrice Maurice de, Duc de Magenta, Marshal of France, and President of the French Republic from 1873 to 1879 (*16th Septennate*), was born in 1808 of Irish parents exiled for Jacobite sympathies, and died in 1893. Educated at St. Cyr, he served in Algeria; assisted in storming the Malakov (Crimea) in 1855; and, in the campaign of 1859 against Austria, he won (with Napoleon III) the battle of Magenta (Italy), being created duke and marshal on the field. From 1864 to 1870 he was Governor-General of Algeria. In the Franco-Prussian War (1870-1) MacMahon took command of the 1st Army Corps; was defeated at Weissenburg and Worth, and carried out a masterly retreat to Châlons. Reorganizing, he marched to relieve Bazaine and raise the siege of Metz, but was encircled by the Germans in Sedan, wounded in the ensuing battle, and captured before the final surrender. After the armistice he was employed in suppressing the Parisian communists, and succeeded Thiers as President. As a result of political crises in 1877 and 1879 he resigned office. *MacMahon* is an Algerian railway town named after the Marshal. — Cf. E. Daudet, *Le Maréchal de MacMahon*.

Mâcon, a town and capital of Saône-et-Loire, France, on the River Saône, a centre of trade in Burgundy wine. The cathedral of St. Vincent was destroyed during the Revolution, the ruins being still extant. Mâcon was the Roman *Matisco*, and was a bishopric from the seventh century until suppression in 1790. Prior to 1477 it formed part of the Duchy of Burgundy. Pop. 16,000.

Ma'con, a city of Georgia, United States, county town of Bibb county, on the Ocmulgee River, and almost in the centre of the state. It is an important railway centre, and has cotton manufactures. Pop. 53,000.

Macpherson, James, Scottish author, was born in 1736, and died in 1796. He studied at Aberdeen and Edinburgh; became a school teacher, and afterwards a tutor; and in 1760 published *Fragments of Ancient Poetry*, translated from the Gaelic or Erse language. The success of this venture enabled Macpherson to issue the so-called poems of Ossian in the form of *Fingal*, an ancient epic poem in six books (1762, 4to), and *Temora* and other Poems (1763, 4to). The genuineness of these poems was severely questioned (see *Ossian*), but the 'editor' maintained his position without submitting the necessary proofs. Macpherson was afterwards agent to the Nabob of Arcot; had a seat in the

House of Commons from 1780 to 1790, and was interred in Westminster Abbey. He was the author of a prose translation of Homer's *Iliad*, and of some other works. Macpherson's poetry had an influence on romantic literature both in England and in Germany. — **BIBLIOGRAPHY:** J. S. Smart, *James Macpherson: an Episode in Literature*; H. A. Beers, *History of English Romanticism in the 19th Century*.

Macquarie, a sub-Antarctic island of the Southern Pacific, administered by Tasmania. The habitable island is 20 miles long and approximately 3 miles broad, and abounds in birds and animals. Kerguelen cabbage (q.v.) is found. Sea-elephants averaging about 2 tons in weight abound in the Macquarie waters, and seals were once common, but ruthless slaughter by the sealers has now exterminated them. There is a meteorological and wireless station. The two island clusters north and south of the main island are called Judge and Clerk and Bishop and Clerk respectively.

Macready (mak-re'di), William Charles, English tragedian, born in London 1793, died at Cheltenham 1873. His father, the lessee and manager of several provincial theatres, sent him to Rugby and Oxford to be educated, but circumstances compelled him to join his father's company at Birmingham in 1810. Afterwards he played in the provinces with considerable success, and appeared at Covent Garden in 1816. In 1820 he made his first visit to America, and in 1828 played in Paris, with great success in both countries. He undertook the management of Covent Garden in 1837, and Drury Lane in 1842, but although he did much to reform the stage, both in respect of its moral and in respect of the artistic qualities of the representations, and endeavoured to cultivate the public taste for Shakespearean drama in both theatres (he himself taking the leading parts in Shakespeare's plays), his pecuniary losses required him to retire from management. He finally retired from the stage in 1851. His *Reminiscences* appeared in 1875. Cf. W. Marston, *Our Recent Actors*.

Macrobius, Ambrosius Aurelius Theodosius, a Latin author in the reigns of the Emperors Honorius and Theodosius (end of fourth and beginning of fifth century A.D.). He was the author of a work entitled *Saturnalia*, valuable for the light it throws upon the manners and customs of antiquity. He also wrote a commentary on Cicero's *Somnium Scipionis*, and a treatise, *De Differentiis et Societatibus Græci Latiniq. Verbi*.

Macrocy'stis, a genus of marine Algae, family Laminariaceæ. The *M. pyrifera* exceeds all other vegetable productions in the length of its fronds, some of which have been estimated on reasonable grounds to attain a length of 700

feet. It is found in the southern temperate zone, and in the Pacific as far north as the Arctic regions.

Macroom', a town and urban district of Cork, Ireland, on the Sullane. The castle is said to have been built by King John, and was besieged and burnt on several occasions in the seventeenth century. Macroom is a railway terminal station. Pop. 3000.

Macrosporium, a genus of parasitic Fungi Imperfecti, section Hyphomycetes. *M. solani* causes a leaf-curl in potato, *M. tomato* the black-rot of tomatoes, and *M. nobile* a spot-disease of carnations. Spraying with sulphide of potash or Bordeaux mixture is the best remedy.

MacWhirter, John, Scottish painter, born in 1839, died in 1911. He was educated at Peebles and the School of Design, Edinburgh. In 1864 he was elected A.R.S.A., in 1879 A.R.A., and R.A. in 1893. He is famous chiefly as a landscape-painter, and among his best-known works are: *Loch Coruisk* (1870), *The Lady of the Woods* (1876), *The Three Graces* (1878), *The Vanguard* (1878), *The Valley by the Sea* (1879), and *Crabbed Age and Youth*.

Madagascar, a French island in the Indian Ocean, at least 240 miles from the south-east coast of Africa, from which it is separated by the Mozambique Channel; length, 980 miles; greatest breadth, 300 miles; area, 228,000 sq. miles. Orographically the principal features are the small Northern and the larger Southern Plateaux, connected by a low saddle. Extinct volcanic peaks are numerous; that of Ankaratra (8700 feet) is the highest point in the island. Rivers are numerous, short, and unnavigable. The climate is subtropical, with a wet season from December to April, and the flora and fauna are extensive and varied. Lemurs are numerous. Antananarivo (pop. 63,115) in the interior is the capital; Tamatave (15,000), Majunga (7300), and Tuléar (2500) are the chief ports; Diégo-Suarez (10,400) and Mananjary (9000) are also important. (The populations given are approximate.) Agriculture and stock-raising are extensive native monopolies, rubber, mulberries, cloves, vanilla, rice, sugar, manioc, cacao, cotton, and ground-nuts being produced, and the afforested interior yields teak and other valuable woods. Horses, pigs, sheep, ostriches, and goats are raised. Meat-canning and the preparation of food-stuffs are under European control, and there are canneries at Antananarivo, Tamatave, Diégo-Suarez, and Bo-ananary. Among minerals, graphite is exported; gold, copper, lead, silver, manganese, nickel, and coal (lignite) have been worked. Imports are mainly cottons, liquors, machinery, cement, lime, and clothing; and exports, gold-dust, cattle, tanning-bark, rice, and hides—all in order of importance.

Internal communications are generally poor, but there is a railway from Antananarivo to Tamatave (220 miles) with several branches; in all 776 miles of track (1919). There is postal communication, and a telephone system, inland telegraphs, three Government wireless stations, and cable connections with Mozambique, Mauritius, Réunion, and Aden. The population of Madagascar is varied, and comprises the Malagasy or indigenous inhabitants with their numerous subdivisions, Hindus, Chinese, and French. The estimated population in 1919 was 3,545,264, 15,157 being French, 5000 Hindus, 1600 Chinese, and 3,520,096 Malagasy. Of the numerous Malagasy tribes the Hovas (1,097,458) and the Betsileo (515,005) are pre-eminent. The Hovas are of exceptional intelligence, and rapidly acquire the arts of wood- and metal-working, so that, although manufactures do not exist in Madagascar as yet, manufacturing enterprise does not lack potentially efficient labour. Missionary efforts have resulted in a partial conversion of the natives, 450,000 of whom embrace Protestantism, and 50,000 Roman Catholicism. The language is of the Malayo-Polynesian division.

History.—Madagascar was known to Marco Polo (thirteenth century), and in 1506 was visited by Portuguese, who called it S. Lorenzo. Radama I became King of the Hovas in 1810, and he permitted missionaries to teach in the capital (1820), when the Bible was translated into Malagasy and the language was first reduced to a systematic written form. By a treaty of 1885 Madagascar became a French Protectorate. In 1890 Great Britain recognized the Protectorate to secure French influence in Zanzibar, the transfer of Heligoland to Germany being contemporaneous. Queen Ranavalona III confirmed the treaty in 1895, and in 1896 Madagascar was declared a colony of France, the native government being retained. A rebellion caused the deposition of the queen, her exile to Réunion and afterwards Algeria, and the government of the island is now in the hands of a Consultative Council of Administration, sitting at Antananarivo. Madagascar is divided into twenty-four provinces and seventy-five districts, supervised by officials of the Council, who are usually natives. The Comoro Islands (q.v.) form one of the Madagascar provinces. The island has no elective assembly, and is not represented in the French Parliament.—**BIBLIOGRAPHY:** W. E. Cousins, *Madagascar of To-day*; E. W. Dawson, *Madagascar: its Capabilities and Resources*; G. Gravier, *Madagascar*.

Maddalena, an Italian island on the northern seaboard of Sardinia, which with the adjacent islands forms a fortified naval and torpedo station.

Maddaloni, a town of Caserta, Italy, 16

miles north-east of Naples. Near by is the famous Ponté della Valle, a three-storied aqueduct, 215 feet high and 25 miles long. Weaving and quarrying are the main industries. Pop. 20,000.

Madder, a dye-plant, *Rubia tinctorum*, nat. ord. Rubiaceæ. It is a climbing perennial, with whorls of dark-green leaves, and small yellowish cross-shaped flowers. The prepared root is used as a red dye-stuff. It yields colours of the greatest



Madder (*Rubia tinctorum*)

1, Section of flower. 2, Pistil.

permanence, and is employed for dyeing both linen and cotton. Two kinds of it are fixed upon cotton; one is simply called *madder-red*, and the other, which possesses a much higher degree of lustre and fixity, is called *Turkey* or *Adrianople red*, because it was for a long time obtained entirely from the Levant, where it was called *alizara*. The colouring principle of madder is termed *alizarine*, and as this can now be obtained artificially from coal-tar, the use of madder in dyeing is almost entirely superseded by that of artificial alizarine.

Madeira, a group of Portuguese islands, in the Atlantic, off the coast of Africa, the chief being Madeira and Porto Santo. Area, 314 sq. miles; pop. about 170,000. Madeira proper derives its name from the dense primeval forest that once enwrapped it. (Port. *madeira*, timber;

Lat. *materia*.) It is roughly 35 miles long by 11 to 12 miles broad, of volcanic origin and mountainous, culminating in Pico Ruiva (6055 feet) and Pico Grande (3391 feet). The climate is mild and equable, and Madeira has consequently become a health-resort for Europeans. The northern part of the island is irrigated, and produces cereals and vegetables; the lowlands abound in orange, coffee, banana, lemon, and many other varieties of fruit-trees. Madeira wine, a product similar to sherry, but of exceptional flavour and bouquet, is made from Madeira-grown grapes, and was first produced in 1485. Wicker goods, sugar, grapes, wine, arrowroot, and lace are exported. Funchal on the south coast is the capital. In Porto Santo water is scarce, and wines and grain are the only products. Madeira was colonized by Portugal in 1419, held by Spain between 1580 and 1640, and was in British hands from 1807 to 1814. A line regiment of Portuguese infantry forms the normal garrison of the group. The Habsburg family arrived at Funchal on 10th November, 1921, where they were exiled by the Supreme Council, and where Karl, 'the last of the Habsburgs', died of pneumonia on 1st April, 1922. -Cf. C. A. Power, *Tourists' Guide to the Island of Madeira*.

Madeira, the principal tributary river of the Amazon, South America. It is formed by the union of the Beni and Mamoré on the Brazil-Bolivian frontier, and flows through Amazonas to the Amazon, which it enters near Serpa, 78 miles below Manaus. The total length is about 2000 miles, and the drainage area about 400,000 sq. miles. The Madeira is navigable for ocean steamers as far as Porto Velho, 1500 miles from the sea, a wireless station, and the base of the wonderful Madeira-Mamoré forest railway. See *Mamoré*.

Madero, Francisco, President of Mexico, born 1873, died 1913. He was the National Democratic party's candidate for the presidential election of 1910, but was arrested, imprisoned for a time, and finally compelled to flee to the United States. Returning, he led a revolt, and replaced Díaz as President on 1st Oct., 1911. On 9th Feb., 1913, he was captured by insurgents, and subsequently murdered.

Madison, a city and capital of Wisconsin, United States, lies between Lakes Mendota and Monona in a district famous for its scenery. The State university was established in 1848, and introduced a system of correspondence instruction in 1911. Trade is mostly in agricultural goods. Pop. (1920), 38,378.

Madras, a maritime city, capital of Madras Presidency, and third city of India, on the Coromandel coast. It has no natural harbour, but has become the first seaport of the Deccan, and the fifth of India, by the construction of

an artificial harbourage. Madras is the headquarters of the Government during the cool season. It has railway communication by four systems with Calcutta, Calicut, Bombay, and Tuticorin. The native and business quarter of the town, on the foreshore, was formerly called Black Town, but since 1905 has been called George Town; it is still densely peopled, and forms the commercial centre. Triplicane is also a squalid native quarter, abounding in Hindu temples. Madras University was founded in 1857, and the Scots Kirk dates from 1821. There is a Supreme High Court with twelve judges (1920). Unlike other great Indian seaports, the town has no exporting monopoly of a specific commodity, and there are few manufactures. Madras was founded in 1639 by the East India Company, who were granted a site close to the Portuguese settlement, St. Thomé (founded 1504), by the Rajah of Chandragiri. The city gradually grew up around the citadel and fort of St. George (which still exists as a barracks and as Government offices). In 1702 it was successfully defended against Aurangzib's army under Daud Khan. After an attack by the Marhattas in 1741 Madras was taken by the French under Labourdonnais (1746), but was restored in 1748 (Treaty of Aix-la-Chapelle). It was ineffectually besieged by the French under Lally-Tollendal (1758-9). Pop. 518,660.

Madras, Presidency of, one of the fifteen administrations of British India; area, 142,330 sq. miles, including native states. The three chief rivers, Godavari, Kistna or Krishna (with the Tungabhadra), and Kaveri, rise in the Western Ghâts and enter the Bay of Bengal. The Eastern and Western Ghâts form its chief surface features. The climate is varied; in the Nilgiri Hills it is temperate, on the Malabar coast the monsoon brings an excessive rainfall, while in the central tableland the rainfall is low and the heat almost unendurable. The soil is sandy along the coast, but there are many fertile districts; while iron, copper, lead, and coal are found in considerable quantities. There are extensive forests yielding teak, ebony, and other valuable timber trees. The total afforested area under the State Forest Department is 19,304 sq. miles (1918-9). The principal products are rice, millet, maize, and other grains; sugar-cane, cotton, oil-seeds, indigo, tea, coffee, tobacco, plantain, tamarind, jack-fruit, mango, melons, coco-nuts, ginger, turmeric, and pepper. About 32,000,000 acres are cropped annually, of which 9,000,000 acres (approximately) are irrigated. About 22,000,000 acres are unavailable agriculturally. The actual area under tea, plucked in 1919-20, was 28,200 acres. The wild animals comprise the elephant, tiger, cheetah, jackal, and wild hog. The administration of Madras is now

regulated by the Government of India Act, 1919, which came into force in 1921 (see *India*). The revenue, which considerably exceeds the expenditure, is over £10,000,000 annually. The pop. is 42,300,000, mainly Hindus, and the native protected states have in addition a pop. of 4,190,322. The chief languages spoken are the Dravidian, namely, Tamil, Telugu (which are spoken by the great majority of the inhabitants), Canarese, and Malayalam, while Hindustani is the language spoken by the Mahommedans.—Cf. E. Thurston, *The Madras Presidency*.

Madre-de-Dios (Sp., 'Mother of God'), the easternmost department of Peru, created in 1912. It is to a large extent an impenetrable forest inhabited by savages (unconquered tribes of the Mashos and Campas). The principal communication is by the Cuzco-Arequipa-Mollendo Railway. Mineral and other natural resources are undeveloped. Maldonado, at the junction of the Tambopata and Madre-de-Dios Rivers, is nominally the seat of government. Area, about 24,747 sq. miles; pop. estimated at 13,500 (1921). The River Madre-de-Dios (native, Quichua Anarumayu) is the principal navigable tributary of the Beni (q.v.); length, about 950 miles.

Mad'repore, a coral-building polyp of the genus *Madrepora*, the type of the family *Madreporida*, forming coral of stony hardness and of a spreading or branching form, hence called *tree-coral*. Madrepore coral is of a white colour wrinkled on the surface and full of little cavities, in each of which an individual polyp was lodged. These polyps raise up walls and reefs of coral rocks with astonishing rapidity in tropical climates. The term is often applied also to other branching corals.

Madrid (*má-drid*'), the capital of Spain, on the Manzanares, near the centre of the Iberian Peninsula. Situated upon a high treeless plateau, 2100 feet above the sea, wind-swept from the snowy Guadarrama, with unhealthy daily and seasonal extremes of temperature, the city has no climatic advantages. Ten streets converge on the Puerta del Sol, the busiest and brightest square of the city. The royal palace (1764) is in the form of a quadrangle enclosing a court, and is 500 feet long and from 80 to 165 feet high. It occupies the site of a palace which succeeded the Moorish Alcazar, and was burned in 1734. The Bull-Ring (Plaza de Toros) seats 12,000 spectators. The Boulevard del Prado is a magnificent thoroughfare $2\frac{1}{2}$ miles in length. Founded in 1892, the Biblioteca Nacional houses the National Library (upwards of 700,000 volumes) and several museums. Tobacco, soap, cork, jewellery, furniture, and perfumes are a few of the productions of Madrid, and books and publishing are of importance. The University of Madrid, transferred from Alcalá de Henares in

1836, has faculties of philosophy and letters, sciences, law, medicine, and pharmacy. Madrid is first mentioned about A.D. 930-933. Philip II definitely made it the capital (1500). Cervantes lived in Madrid from 1600 till his death, and during this period he produced the latter half of *Don Quixote*. Until the middle of the eighteenth century Madrid was reputed to be 'the dirtiest capital in Europe'. Pop. (1918), 652,157.—Cf. A. F. Calvert, *Madrid*.

Mad'rigal (Fr. *madrigal*; It. *madrigale*), a short amorous poem, consisting of not less than three or four stanzas or strophes. The madrigal was first cultivated in Italy, and those of Petrarch and Tasso are among the finest specimens of Italian poetry. Several English poets of the time of Elizabeth and the Charleses wrote madrigals of notable grace and elegance, the chief names being Lodge, Wither, Carew, and Suckling. The term is also applied to an elaborate vocal composition now commonly of two or more movements, and in five or six parts. The musical madrigal was at first a simple song, but afterwards was suited to an instrumental accompaniment. Famous English composers of musical madrigals are: Morley, Bennett, Ward, Gibbons, Dow, and Ford.

Madur. District of Madras Presidency, India: a plateau drained by the Vaigai River. It is a irrigated agricultural area, producing cotton and subtropical grains. Area, 4900 sq. miles; pop., 2,000,000. The capital is Madurai, on the Vaigai, once the religious and political capital of Southern India, and renowned for its Great Temple of Siva. Pop. 134,130.

Madura, an island of the Dutch East Indies, north-east of Java, of which it forms a Residency, and from which it is separated by the broad Strait of Madura. The Madurese are mainly Mohammedan, and have a national language. Chief occupations, agriculture, and fishing are the chief occupations. Area, 1700 sq. miles; pop., 10,000.

Mace nas. Lucius Cilnius, a distinguished Roman born between 73 and 63 B.C., died 8 B.C. He was the companion of the Emperor Augustus in nearly all his campaigns, and his most trustworthy counsellor in political matters. For the three years 18-15 B.C. he was invested with the government of Italy. He is chiefly famous, however, as a patron of learning, and the friend of Virgil and Horace (q.v.).

Maelström ('grinding stream'), an ocean current between the Norwegian islands Moskenes and Mosken, in the Lofodens. It is formed by the pouring of the tide through a narrow strait, and assumes a formidable appearance during a 'nor'-wester', when the wind blows against the current.

Maesteg, an urban district of South Wales, in

Mid-Glamorganshire, on the River Llyfny. There are collieries and ironworks in the neighbourhood which, like Maesteg, owe their existence to the South Wales coal-field. Pop. 28,060.

Maestricht, or **Maastricht**, a town and capital of the Dutch province of Limburg, on the Maas (Meuse), near the Belgian-Dutch frontier. The town has a large river trade, and has breweries and manufactures of earthenware and paper. The church of St. Servatius was founded between A.D. 500 and 550, and is the oldest in the Netherlands; the Stadhuys dates from 1664, and there are quarries (Petersberg) worked by the Romans in the vicinity. The town was plundered by the Spanish under Parma (1579); fell to Louis XIV (1678); to Marshal Saxe (1749), and to Kléber (1794). It was successfully defended by the Dutch against the Belgians in 1830. Until 1871 it was one of the first fortresses of Europe. Pop. 41,300.

Maeterlinck (mä'ter-lingk), Maurice, Belgian author, born at Ghent in 1862, studied there, adopted the law as a profession, but latterly has lived as a literary man in Paris. His first publication was *Serres Chaudes*, a volume of verse (1889); but he is best known as a dramatist, among his plays being *La Princesse Maleine*, *Les Aveugles*, *Pelléus et Mélisande*, and *Aglavaine et Sélysette*, all of which have been translated into English. They betray a pessimistic spirit with tendency to mysticism, but in a subsequent drama, *Monna Vanna*, he freed himself from this. He is also known as an essayist, and writer of works of a philosophic character, his works in this field including *Le Trésor des Humbles* and *La Vie des Abeilles*, both translated into English. *L'Oiseau bleu* (1900), a symbolical play for children, was much discussed when it was produced in England as *The Blue Bird*.

Mafeking, a town of Bechuanaland, Cape Province, the administrative centre of the Bechuanaland Protectorate. It was the starting-point of the Jameson Raid (1895), and was defended by Baden-Powell against the Boers from 12th Oct., 1899, to 17th May, 1900. Pop. 2300.—Cf. J. A. Hamilton, *Siege of Mafeking*.

Mafia, a Sicilian secret society similar to the Neapolitan Camorra, but much more powerful. Its organized lawlessness has baffled all attempts of the Government to suppress it. Its members are bound never to carry their suits to the regular courts nor to give evidence before them. Murder and robbery, though discountenanced under ordinary conditions, are resorted to without hesitation in the case of informers or specially obnoxious persons. Blackmail is levied from landowners, who are required to employ none but *mafiosi* in certain occupations, and the society further makes its power felt by means of the *rendetta* and an extreme form of boy-

cotting. Criminals are protected and elections controlled by this infamous association, whose authority is greater than that of the law among the lower classes in Sicily.

Mafra, a town of Estremadura, Portugal, famous for its convent, built (1717) by John V. It consists of a church, a monastery, and a palace; and there were also barracks. The entire building forms a quadrangle 820 feet long by 720 feet wide.

Magadha, an ancient kingdom of India which lay about the modern Bihar, south of the Middle Ganges. Pataliputra, now Patna, was the capital. Magadha was the nucleus of the first Indian Empire, destroyed in 184 B.C.

Magallanes, a territory of Southern Chile extending from lat. 47° S. to Cape Horn. The territory embraces half of Tierra del Fuego. The mainland is wild and afforested, and deeply indented with fjords of a Norwegian type, and the innumerable islands on its coasts are separated by deep, narrow channels. Punta Arenas is the principal settlement. Area, 65,355 sq. miles; pop. (1910), 34,752.

Magdala, a town and fortress of Abyssinia (q.v.). Pop. about 3000.

Magdalen, or **Magdalene**, Mary (i.e. Mary of Magdala), a woman mentioned in the New Testament as having had seven devils cast out of her, as watching the crucifixion, and as having come early to the sepulchre on resurrection morning. She was erroneously identified with "the woman who was a sinner" (*Luke*, vii, 37); hence the term *Magdalen* became synonymous with penitent harlot. Cf. *Luke*, viii, 2.

Magdalena, the principal river of Colombia, South America, rising in the central Cordillera of the Andes, in Ecuador, and flowing northwards through Colombia to the Caribbean; course, 1050 miles; drainage area, about 90,000 sq. mile. The Magdalena is navigable for 600 miles up stream to Honda.

Magdalena, a department of Colombia, South America, facing the Caribbean Sea, and bounded by the Magdalena on the west. Gold and coal are mined; coffee, sugar, and maize are produced, with some valuable woods and live-stock. Santa Marta is the capital. Area, 19,080 sq. miles; pop. (1918), 204,386.

Magdalen College, Oxford, was founded in 1458 by William of Waynflete, Bishop of Winchester and Lord High-Chancellor of England.

Magdalene College, Cambridge, was founded in 1519 by Thomas, Baron Audley of Walden.

Magdeburg, the capital of Magdeburg district, Prussian Saxony, on the Elbe, which here divides into three arms. The Dom or cathedral dates from the thirteenth century. Machinery, castings, sugar, tobacco, fertilizers, chemicals, pottery, alcohol, cotton, and leather are among

the manufactures. Magdeburg is the most important beet-sugar centre of Germany. Historically the town is of great interest. Charlemagne granted it definite privileges (808); the Benedictine monastery (founded 937) became an archbishopric (908); and Magdeburg was placed under the ban of the empire and taken by Maurice of Saxony in 1551. During the Thirty Years' War the city was unsuccessfully besieged by Wallenstein (1620), but the Swedish garrison surrendered to Tilly in May, 1631, when Magdeburg was sacked and thousands of unarmed citizens were put to the sword. In 1648 the archiepiscopal lands were erected into a duchy, and passed to Brandenburg in 1680. Marshal Ney captured Magdeburg in 1806, and from 1807 to 1813 it formed part of the Kingdom of Westphalia. Pop. (1910), 285,856.

Magellan, Ferdinand (Port. *Fernão de Magalhães*), Portuguese navigator, born about 1470, died about 1521. He served under Albuquerque in the East Indies; distinguished himself at the taking of Malacca; and in 1519 Charles V of Spain appointed him to command five ships, in which he discovered the strait that bears his name and also the Pacific Ocean. Eventually he reached the Philippines, but was killed in a skirmish with the natives of Mactan. His expedition doubled the Cape of Good Hope and returned to Seville, having circumnavigated the world.

Magellan, Strait of, the channel, connecting the Atlantic with the Pacific, which lies between Tierra del Fuego and the Chilean mainland. The greatest length is about 360 miles, and it varies in breadth from 2½ miles to 17 miles. Between 1826 and 1836 the *Beagle* explored and charted the strait, upon which the only port is Punta Arenas, the most southerly town in the world.

Magellan's Clouds, two oval-shaped cloud-like masses of light in the southern hemisphere near the pole, consisting of swarms of stars, clusters, and nebulae of every description. They cover spaces in the heavens of 42 and 10 square degrees respectively, and look much like detached portions of the Milky Way.

Magenta, a town of Milan, Italy, where, on 4th June, 1859 (Franco-Austrian War), the French and Sardinians under Napoleon III and Marshal MacMahon gained a decisive victory over the Austrians. Pop. 8600.

Maggiore, Lago, a lake partly in Northern Italy and partly in the canton of Ticino, Switzerland, where it is called *Locarno*. It is the *Lacus Verbanus* of the Romans, and nestles in an amphitheatre of hills 630 feet above sea-level. Maggiore is 39 miles long, from ½ to 5½ miles broad, and 1100 feet deep in parts. The Borromean Islands (q.v.) lie directly opposite Pallanza.

Magi (mā'ji), the hereditary priests among the Medes and Persians, set apart to manage

the sacred rites, and preserve and propagate the sacred traditions, acting also as diviners and astrologers. The connection of the magi with astrology and enchantment in time brought it about that they acquired unbounded influence both in public and private life. They were entrusted with the education of youthful princes, and became the trusted companions of the sovereign. Their order was reformed by Zoroaster. The name came also to be applied to holy men or sages in the East.

Magie, the art or pretended art or practice of producing wonderful effects by the aid of superhuman beings or of departed spirits or the occult powers of nature. The word is used to include a mass of beliefs and practices which bear on matters beyond the ordinary known actions of cause and effect. A large proportion of magical rites are connected with the religious beliefs of those using them, their efficacy being ascribed to supernatural beings. There is, however, a non-spiritual element in magic which depends on certain imagined powers and correspondences in nature, that can be utilized in various ways. (See *Alchemy; Astrology; Charm; Divination; Witchcraft.*) In savage countries the native magician is often sorcerer and priest, and sometimes chief of the tribe. Among the ancient Egyptians magic was worked into an elaborate system and ritual, and it was regularly practised among the Babylonians and Assyrians, as well as in Greece and Rome. Alexandria, from the second to the fourth century, became the headquarters of theurgic magic, in which invocations, sacrifices, diagrams, talismans, &c., were systematically employed. This system, influenced by Jewish magical speculation, has a strong hold in mediæval Europe. The name *natural magic* has been given to the art of applying natural causes to produce surprising effects. It includes the art of performing tricks and exhibiting illusions by means of apparatus.—**BIBLIOGRAPHY:** Andrew Lang, *Magic and Religion*; Sir J. G. Frazer, *The Golden Bough*; Lynn Thorndike, *The Place of Magic in the Intellectual History of Europe*; A. C. Haddon, *Magic and Fetishism*.

4	9	5	16
14	7	11	2
15	6	10	3
1	12	8	13

2	7	6
9	5	1
4	3	8

Magic Squares

Magic Square is a term applied to a series of numbers in arithmetical progression, arranged

in equal and parallel rows and columns, in such a manner that the vertical, horizontal, and diagonal columns when added shall give the same sums. There are also *Magic Circles, Magic Cubes, Magic Cylinders, Magic Spheres, &c.*, in all of which the same result is brought about by various arrangements of the terms of an arithmetical series.

Maginn (ma-gin'), William, born at Cork 1793, died at Walton-on-Thames 1842. He was educated at Trinity College, Dublin, and established himself as a literary man in London. He was for long a regular contributor to *Blackwood's Magazine* and was successively editor of *The Standard*, of *Frazer's Magazine*, and other publications. His *Homeric Ballads* and *Shakespeare Papers* were collected and published after his death.

Magistrate, a public civil officer invested with the executive government or some branch of it. In this sense a king is the highest or first magistrate in a monarchy, as is the president in a republic. But the word is more particularly applied to subordinate officers, to whom the executive power of the law is committed, either wholly or in part, as governors, intendants, prefects, mayors, justices of the peace, and the like. In England the term is usually restricted to justices of peace in the country, and to police and stipendiary magistrates in London and the larger towns; and in Scotland to the provost and bailies in burghs.

Magma, in geology, the molten mass from which an igneous rock develops, whether as a glass, through rapid cooling, or as an assemblage of crystals of various mineral species.

Magna Charta Libertatum, the Great Charter of Liberties, a document forming part of the English Constitution, and regarded as one of the mainstays of English liberty, extorted from King John at Runnymede in 1215 by the confederated barons. Articles provide that no freeman shall be taken, or imprisoned, or proceeded against except by the lawful judgment of his peers or by the law of the land; and that no scutage or aid shall be imposed in the kingdom (except certain feudal dues from tenants of the Crown), unless by the common council of the kingdom. The remaining and greater part of the charter is directed against abuses of the king's power as feudal superior. It originally contained sixty-three clauses; subsequent confirmations altered the number of these till 1225, when it took its final and accepted legal form with thirty-seven clauses. The most accurate and complete copy of the original charter is that preserved in Lincoln Cathedral. The Board of Commissioners on the public records ordered a facsimile of it to be engraved, and it has been frequently translated into English.—Cf. W. S. M'Kechnie, *Magna Charta*.

Magna Græcia, the collective name given to the Greek cities and settlements in Southern Italy mostly founded in the eighth century B.C. by different Greek peoples. The Chalcidians founded Rhegium about 730 B.C.; and subsequently Croton, Sybaris (by the Achæans), Tarentum (by Laconian Dorians), Metapontum (by the Achæans), &c., were founded. These colonies and their offshoots reached a great pitch of wealth and power in the seventh and sixth centuries B.C. Mutual discord, however, gradually weakened them, and their independent existence came to an end in the third century B.C., when they were conquered by the Romans.

Magnallium is the name given to alloys consisting mainly of aluminium, with magnesium and small quantities of other metals. Those found on the market at the present time contain only 1 to 2 per cent of magnesium as a rule, together with similar quantities of one or more of the metals, copper, nickel, and tin. The alloys are light, their specific gravities differing little from that of aluminium, but they are superior to aluminium in strength and ease of working. They have been used extensively instead of brass for parts of scientific instruments, &c.

Magne'sia, the name of two ancient cities of Asia Minor. *Magnesia ad Meandrum* was a city of Ionia, on the Lethæus, a tributary of the Meander. It was an Æolian city, was destroyed by the Chimerians, and rebuilt by the Milesians or Ephesians. *Magnesia ad Sipylum* is the modern *Manisa*, a large city on the railway from Smyrna, and the junction of a line to Panderma, on the Sea of Marmara. Cotton is manufactured. Manisa was the capital of the thirteenth-century Byzantine government, and was the residence of Murad II after his exile. It was anciently a city of Lydia.

Magne'sia, a white, tasteless, earthy substance, possessing alkaline properties, the oxide of magnesium (q.v.). It is absorbent, antacid, mildly cathartic, and almost insoluble. It is found native as periclase, and exists as a component part of several minerals. In commerce pure magnesia is generally distinguished by the term *calcined magnesia*. It is readily obtained by exposing the hydrated carbonate to a red heat. The commercial *magnesia alba* is a basic carbonate. The chief use of magnesia and its carbonate is in medicine.

Magnesian Limestone, a yellowish rock composed of carbonates of lime and magnesia, as the joint mineral carbonate, dolomite, but usually with some excess of calcium carbonate as calcite. There are several varieties, more or less useful for building or ornamental purposes, which are included under the generic rock-name dolomite. This rock is very largely developed in the Permian system of North-East England.

Magnesite, native magnesium carbonate, $MgCO_3$, a mineral occurring in white compact masses, or sometimes as crystals. It is used for the lining of furnaces, where a high temperature is essential, and in the manufacture of cement for floors; as a source of magnesia; as a substitute for plaster of Paris, &c. Formerly the supply came mostly from Greece; but the great demand has led to a large development in the United States.

Magne'sium, a metal; symbol, Mg; atomic weight, 24.32. It is usually prepared by the electrolysis of the fused chloride or of carnallite. It has a silver-white colour, a high metallic lustre, and low specific gravity. It is usually met with in the form of ribbon or powder. When heated in oxygen or air, it burns with a brilliant white light rich in actinic rays, and is used for pyrotechnics and also as a flash-light in photography. The product formed when it burns is a white ash, magnesia, MgO (q.v.). The chief salts are the carbonate, the chloride, the sulphate (Epsom salts), the phosphates and the silicates, among which are the hydrous mineral silicates talc, meerschaum, and a large number of silicates of magnesium with iron, calcium, &c.

Magnetism, the science which treats of the properties of magnets, also the name of the thing which is the cause of these properties. All substances may, by the use of very intense magnetic forces, be shown to have magnetic properties, but these properties are possessed, in a notable degree, only by iron, steel, nickel, cobalt, lodestone, and Heusler's alloy, an alloy composed of three unmagnetic metals, copper, manganese, and aluminium. These substances are classed as *ferromagnetic*; others in which the property is feeble are *paramagnetic*; whilst those which appear to be less magnetic than air are *diamagnetic* (q.v.). Lodestone was first found as a natural magnet in Magnesia, Asia Minor, from which place the name 'magnet' is derived. Lodestone or magnetite (see *Iron*) is composed of ferrous-ferrie oxide, Fe_3O_4 ; it exhibits certain properties common to magnets which may be shortly stated. A magnet possesses polarity, i.e. the magnetism appears, so far as external action shows, to be concentrated near the ends of the magnet at two points called the *poles* of the magnet: these two poles are unlike. The magnetism, in reality, permeates the magnet from end to end, since, if a magnet is broken, two magnets are produced, each having opposite poles. Two magnets react on each other in such a way that like poles repel, and unlike poles attract. A suspended magnet, free to move horizontally, comes to rest in a position which lies nearly north and south. The pole which is towards the north is called a *north-seeking pole*, the other a *south-seeking pole*. Magnetic material may be hard,

like steel, or soft, like pure iron. Hard steel is difficult to magnetize, but when magnetized it retains its magnetism, and is as difficult to demagnetize. Such material is used for making permanent magnets. Soft iron, on the other hand, is easily magnetized, but when the magnetic force is withdrawn, the iron also loses its magnetism. This kind of material is required for the cores of electro-magnets and transformers.

Unit Pole, Pole Strength.—Regarding the magnetism as being concentrated at the poles, *unit pole* is that quantity which, when placed 1 cm. distant from an equal similar pole, repels it with a force of 1 dyne. The line joining the two poles of a magnet is the *magnetic axis*, and the quantity of magnetism resident in each pole is the *pole strength*. The product of the pole strength and the distance between the poles is the *moment* of the magnet; for bar magnets the pole distance may be taken roughly as five-sixths of the length of the bar. The force between two poles of strengths m and m' at distance d cm. is mm'/d^2 dynes (Coulomb's Law).

Magnetic Field.—The space round the bar in which the magnetic effect of the bar is perceptible

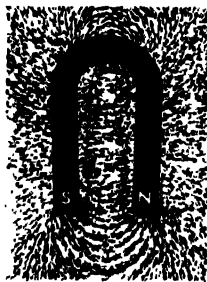
small compass-needle would set itself under the action of the field. The field round a magnet may be supposed to be filled with lines of force; these may extend from one pole to the other, or to neighbouring magnetic material; their distribution may be made out by means of iron filings on paper, or by following out the direction in which a small needle points when moved over the paper. Where the magnetic force is strong, the lines are crowded, and in regions of weak force the lines are further apart. The *field intensity* at a point may thus be expressed by the number of lines of force passing through a unit of area taken perpendicular to the lines.

Magnetic Induction.—When a bar of unmagnetized material is subjected to an increasing magnetic force, the magnetism acquired by the bar increases at first slowly, then more rapidly, and finally attains a state of *saturation* in which it is incapable of becoming more strongly magnetized, however intense the magnetic field may be. At any stage in the process the pole strength of the bar, divided by its sectional area, measures the *intensity of magnetization* of the bar; this quantity depends on the material of which the bar is composed, and the ratio of the magnetization to the magnetizing force is called the *susceptibility* of the material. If we imagine the bar to be crowded with lines from end to end, these lines will be due partly to the applied magnetic field, but mostly to the magnetization of the bar. The total number of lines passing through a unit of sectional area is called the *magnetic induction*, and the ratio of the induction to the intensity of the applied field is known as the *permeability* of the bar. The permeability increases with the induction, attains a maximum value, and then falls off to a very small value at high inductions. Its value is of importance in choosing magnetic material for dynamo iron, and the magnetic qualities of materials are tested by processes based on two fundamental methods, known respectively as the magnetometric and ballistic methods.

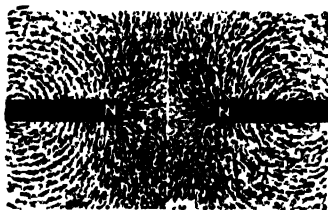
Hysteresis Cycle. In these methods the material is subjected to a cyclic change of magnetic field, under which the magnetization of the body lags behind the magnetizing force—an effect known as *hysteresis* (q.v.). In the course of a complete cycle of magnetization the field is increased from zero until the specimen is saturated, then diminished to zero, reversed, and increased to the same high negative value, again diminished to zero, again reversed, and finally increased to the maximum again. During a complete cycle a certain amount of work is done in magnetization and demagnetization which appears in the form of heat in the body under test, and which, when expressed in ergs



Field of a Bar Magnet



Field of a Horse-shoe Magnet

Field between two similar poles
Magnetic Fields

is known as the *magnetic field*, at any point of which the bar exerts a magnetic force in a definite direction. A *line of force* in a magnetic field is such that a tangent to the line at any point on it denotes the direction in which a

per cubic centimetre is called the *hysteresis loss*. In the course of the cycle the intensity of magnetization when the field is zero is known as the *remanent magnetism*, and the magnetic force required to make the specimen part with its remanent magnetism is the *coercive force*. Material used for permanent magnets requires to possess a high coercive force as well as high remanent magnetism.

Permanent Magnets.—The best available material for permanent magnets consists of a tungsten steel with 5 to 7 per cent of tungsten and $\frac{1}{2}$ per cent of carbon. Honda, in Japan, has brought out a new steel, KS steel, which also contains cobalt, and which is in several respects superior to the above tungsten steel.

Heat Treatment.—A magnet is found to be stronger, and also more retentive, if it is heated to about 900° C., and then cooled or quenched rapidly in water, oil, or brine. It is thereby made mechanically hard, and at the same time its coercive force is much increased.

Maturing. The remanent magnetism is the maximum amount which a magnet retains after saturation, and this amount is subject to loss caused by internal change with time, fluctuations of temperature, and mechanical shock. The magnet loses strength most rapidly immediately after magnetization, and the rate of loss diminishes with time, the magnet ultimately reaching a constant state. To attain this constant condition rapidly, the steel is matured before magnetization by boiling or steaming for ten or twelve hours.

Magnetization. This is most efficiently done by means of a magnetizing coil, through which a strong electric current is passed for a short time. It may also be done by rubbing with another magnet, or by placing the bar between the poles of an electromagnet (see *Electromagnetism*). The magnet is then demagnetized by an amount depending on its shape and dimensions, generally from 5 to 10 per cent.

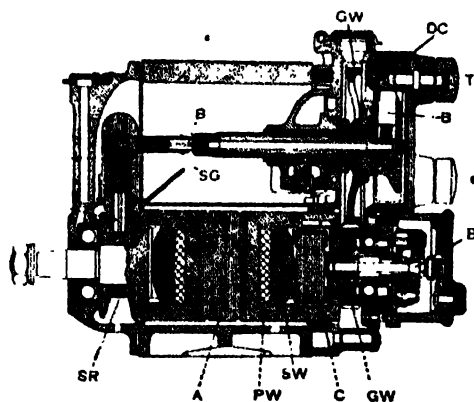
Effect of Temperature.—When a rod of magnetic material is raised in temperature, its magnetic properties change. The permeability of iron in a weak field increases rapidly as the iron approaches a *critical temperature* at 785° C.; on passing through the critical temperature the iron loses its magnetic properties, but regains them on cooling. The magnetic change is comparatively sudden, and is caused by a change in the molecular constitution of the iron. Nickel loses its magnetic properties about 340° C., cobalt at about 1070° C., and magnetite at 580° C. When a piece of steel is cooling down through a dull red heat, it suddenly glows more brightly and then continues to cool; this is known as *recalcence*, and is due to the liberation of latent heat while undergoing internal transformation.

Recalcence takes place in steel at a temperature of about 680° C.

The Magnetic Circuit.—Magnetic lines of force form a circuit whose path, in an iron ring, lies entirely within the iron, but in a bar magnet, lies partly in the steel and partly through the air. By analogy with the electric circuit carrying a current, the total number of magnetic lines is known as the *magnetic flux*; that which gives rise to the flux, e.g. a current of c amperes flowing through n windings of a magnetizing coil, possesses a *magnetomotive force* of value $0.4\pi nc$, and the different parts of the circuit have the property of *reluctance*, measured by $l/\mu A$, where l is the length of the medium, μ its permeability, and A its sectional area. The magnetic flux is equal to the quotient magnetomotive force \div reluctance.—**BIBLIOGRAPHY:** Sir J. A. Ewing, *Magnetic Induction in Iron and other Metals*; S. P. Thompson, *Magnetism of Permanent Magnets* (Journal of the Institute of Electrical Engineers, 1913); S. S. Richardson, *Magnetism and Electricity*.

Magnetite, an important ore of iron, the oxide Fe_3O_4 , crystallizing in the cubic system as octahedra, but more commonly massive. It is black and cannot be scratched by a knife. See *Iron*; *Loudstone*.

Magneto, a type of combined dynamo and transformer used to generate electrical pressures



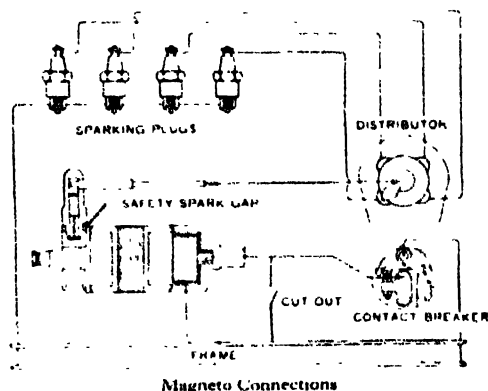
B.L.I.C. Magneto

A, Armature. B, Brushes. BH, Brush-holder. C, Condenser. CB, Contact breaker. DC, Distributor contact. GW, Gear wheels. PW, Primary winding. SG, Safety-spark gap. SR, Slip-ring. SW, Secondary winding. T, Terminal. By permission of Messrs. The British Lighting and Ignition Company, Ltd.

sufficient to jump the gap between the points of a plug by a spark. The invention is due to two Germans, Simms and Bosch, and at the beginning of the European War the magneto industry was practically entirely in foreign hands, but the British magneto-makers by their

MAGNETOMETER

research work and its application to practical design have produced instruments superior to all. The magneto has a permanent magnet field system, and in the air-gap an armature rotates which has two coils wound on it. The first coil is the primary one, and in this coil an electromotive force is generated. The flow of current on the primary coil is interrupted by the contact breaker. At these moments a high electrical pressure is generated in the secondary coil, which is wound on the same core. This secondary supply is conducted to each plug by the distributor, the return being by the frame of the machine. The magnetic field must be sufficiently



strong to ensure the generation of a high electromotive force when running slow or in starting, and to ensure certainty in action at high speeds when working under adverse conditions. The plug referred to has the centre-pin insulated. The side-pins or ring are in metallic connection with the threaded part which screws into the engine cylinder. The condenser is connected across the contact breaker to reduce the sparking. A safety spark-gap is usually provided on the magneto, to allow any exceptionally high voltage current to pass across to earth. The diagram shows the connections of a magneto to a four-cylinder engine.

Magnetometer, an instrument or apparatus used in determining the horizontal component of the earth's magnetic force. The experiment consists of two parts: in the deflection experiment a bar magnet of moment M and pole distance $2l$ is placed with its axis east and west, and its centre at a distance r to the east or west of a delicately suspended magnetic needle, causing the latter to be deflected through an angle θ from the magnetic meridian. If the earth's field has an intensity H at the position of the needle, it may be shown that $M/H = (r^2 - l^2) \tan \theta / 2l$. In the second operation the bar magnet is suspended horizontally in the

MAGPIE

place previously occupied by the needle, and caused to vibrate, like a compass-needle, through a small angle under the action of the earth's horizontal force. Its period T , or time of one complete vibration, is measured, also I the moment of inertia of the bar. These are related by the formula $M/H = 4\pi^2 I / T^2$. Knowing the values of M/H and M/H from the two experiments, both M and H may be found. For accurate work the effects of temperature, induction, and torsion of the suspending system require to be allowed for. The Kew Observatory type of magnetometer may also be employed to measure the declination, or angle between the geographical and magnetic meridians. In observatories the changes of the magnetic elements are automatically recorded by an instrument called a magnetograph. The magnetometer is used for field-work during magnetic surveys; another type has also been employed in which a magnetic field of known value is set up by means of a current flowing in a Helmholtz coil, and the value of H is found from the observed deflection of the needle. — **BIBLIOGRAPHY:** Stewart and Gee, *Practical Physics* (vol. ii); A. Gray, *Absolute Measurements in Electricity and Magnetism*.

Magnolia, a genus of trees and shrubs, type of the nat. ord. Magnoliaceae; named from *Pierre Magnol*, a French botanist of the seventeenth century. The species, which chiefly inhabit North America, Northern India, China, Japan, and other parts of Asia, are trees much admired on account of the beauty of their flowers and foliage, and are in great request in gardens. In their native countries some of them attain great height, and have flowers 10 inches across. The bark of the root of *M. glauca*, or the beaver tree, is an important tonic. *M. tripetala*, or umbrella tree, has also tonic properties. *M. grandiflora*, or big-laurel, and *M. conspicua* or *Yulan*, the yulan or Chinese magnolia, grow well in the south of England, and are splendid ornamental trees. The yulan is remarkable in that it flowers in spring before the leaves expand.

Magnolia Metal is largely used for bearings, for which purpose the alloy should contain a hard and a soft constituent, the function of the former being to resist wear and to provide a surface with a low coefficient of friction, and that of the latter to allow of a uniform distribution of the load and so prevent local heating and seizing. Magnolia metal generally contains 78 to 80 of lead, 15 to 16 of antimony, 5 to 6 of tin, and about 0.25 per cent of bismuth.

Magpie, a bird of the genus *Pica* or related genera, belonging to the Corvidæ or crow family. The common European magpie (*P. rustica*), which ranges eastward to Formosa, and is also found in North America, is about 18 inches in length; the plumage is black and white, the

black glossed with green and purple; the bill is stout, and the tail is very long. The magpies continue in pairs throughout the year, and prey on a variety of food, chiefly animal. They are determined robbers of other birds' nests, destroying the eggs and young birds. In captivity they are celebrated for their crafty instincts, their power of imitating words, and their propensity to purloin and secrete glittering articles. Two related species (*P. mauritanica* and *P. nuttalli*) are native, respectively, to North Africa and California. Blue magpies are found in South Spain (*Cyanopica cooki*) and East Asia (*C. cyana*).

Mahābhārata (literally the great history of the descendants of Bharata), an ancient Indian epic of about 400,000 verses, and divided into eighteen books. The groundwork of the poem is the Kaurava-Pandava War (24,000 verses). In Bharata two brothers established rival thrones: Dhritarashtra, the elder, had a hundred sons, called the Kaurava, the powers of evil; the Pandava, the powers of good, were the five sons of Pandu, the younger brother, by his two wives. Both the Kaurava and the Pandava were related to Krishna, Pritha, mother of three of the Pandava, being aunt of Krishna. The *Mahābhārata* form an encyclopædia of Hindu mythology, legendary history, and philosophy. To Vyāsa, 'the arranger', is attributed the authorship, but this simply means that at one time the fragmentary pieces were welded together in a definite order and sequence to form a complete work.—**BIBLIOGRAPHY:** E. W. Hopkins, *The Great Epic of India: its Character and Origin*; S. Sorensen, *Index to the Names in the Mahābhārata*; V. Valdyn, *The Mahābhārata*; *The Mahābhārata* (in Everyman's Library).

Mahaffy, Sir John Pentland, born in Switzerland 1839, died 1919. He was educated in Germany, and in 1856 entered Trinity College, Dublin, where he became a Fellow in 1864. He was appointed professor of ancient history in 1871, and he was knighted (O.B.E.) in 1918. He wrote: *Lectures on Primitive Civilization*, *Social Life in Greece from Homer to Menander*, *History of Classical Greek Literature*, *Rambles and Studies in Greece*, and *Alexander's Empire*.

Mahānadi, or Mahanuddy, a river of India, rising near Raipur, Central Provinces, and flowing hence through Orissa to the Bay of Bengal, which it enters by several mouths, 120 miles south-west of the Ganges sunderbunds. It is navigable as far as Sambalpur, and a dam at Cuttack supplies the Orissa canal system. The Mahānadi has a course length of about 520 miles, and drains an area of 53,000 sq. miles.

Maharajpur, a village of Gwalior, India, the scene of a desperate battle during the Gwalior War, when the Marhattas under Bhagerat Rao

Scindhia were defeated by the British under Sir Hugh Gough (29th Dec., 1843). During the Indian Mutiny Havelock, on the march to Cawnpore, defeated Nana Sahib here (16th July, 1857), and entered Cawnpore on the following day.

Mahdī (mā'dē; Ar., the Guided One), a name assumed by some of the successors of Mahomet, particularly applied to the twelfth imam, the lineal descendant of Mahomet, born A.D. 868. He mysteriously disappeared, being probably murdered by a rival, and the belief was that he would remain hidden until the 'last days', when he would reappear, and at the head of the faithful spread Mohammedanism over the world. Many professed Mahdis have appeared from time to time in Africa as well as Asia, the chief being Mahomet Ahmed, the leader of the Sudanese insurrection (1883-5). He was born at Dongola in 1843, died at Omdurman 1885. He studied Mohammedan theology at Khartoum and Berber, and at twenty-five years of age he retired to the Island of Aba in the White Nile, where he lived in solitude for fifteen years. At the age of forty his short victorious career as a prophet began. See *Egypt*; *Sudan*.

Mahé, a French settlement on the Malabar coast, Madras, India, at the mouth of a small river of the same name. The settlement is administered by Pondicherry. Pop. (1919), 11,111.

Mahmud (mā'mūd), Sultan of Ghazni, the founder of the Mahommedan Empire in India, born at Ghazni about 970, died 1030. His father, Sabaktagin, Governor of Ghazni, owned a nominal allegiance to Persia, but was really independent. On his death Mahmud put aside his elder brother, formed an alliance against the Persian monarch, overthrew his kingdom, and laid the foundation of an extensive empire in Central Asia (999). He then turned his attention to India, and in a series of twelve invasions secured a great amount of treasure, and vastly extended his power. He was a patron of literature, and brought many men of learning about his court, among whom was the poet Firdusi (q.v.). He established large educational institutions at Ghazni, and spent vast sums on public works.

Mahmud I, Sultan of Turkey, born 1696; reigned 1730-50.—**Mahmud II**, Sultan of Turkey, born 1785, died 1839; placed on the throne by the Janizaries after the murder of his predecessor (1808). The chief events of his reign are the war with Russia from 1808 to 1812, which cost him Bessarabia and the provinces of Serbia, Moldavia, and Wallachia, as settled by the Treaty of Bucharest; the war of Greek independence, which ended in the separation of that country, and the destruction of the Turkish fleet at Navarino, 1820-28; the extermination of the

Janizaries, 1826; the Treaty of Adrianople with the Russians, who were on the point of entering Constantinople, 1829; the independence of Egypt under Mehemet Ali, and the new Treaty of Unkjar-Skelessi with the Russians, 1832-3.

Mahog'any, the wood of the *Swietenia mahog'ani*, a lofty and beautiful tree, indigenous to Central America and the West Indies, belonging to the nat. ord. Meliaceæ. It grows most abundantly, and attains its greatest development between 10° N. lat. and the Tropic of Cancer. It reaches maturity in about 200 years, and grows to a height of 40 to 50 feet, diameter 6 to 12 feet.



Mahogany (*Swietenia mahog'ani*). Leaves, flowers, and fruits

The wood is hard, compact, reddish-brown, and susceptible of a brilliant polish. It is one of the best and most ornamental woods known, and is of universal use in the making of furniture. It is imported chiefly from Mexico and British Honduras. That which is imported from the West Indies is called 'Spanish' mahogany, and is the most valued. *African mahogany* is the wood of *Khaya senegalensis*, and is brought from Sierra Leone. *Indian mahogany* is the wood of *Soyimida febrifuga* found in mountainous districts of India. *Ceylon mahogany* is the *Artocarpus integrifolia*, widely cultivated throughout the warm parts of Asia. *Australian mahogany* is the red gum (*Eucalyptus rostrata*).

Mahomet, or Moham'med, or more correctly Muhammad, the founder of Islam, was an Arabian by birth, of the tribe of the Kuraish, and was born of poor parents in A.D. 571 in Mecca. His parents died early, and he was brought up by his uncle Abu Talib, who trained him to commerce, and with whom he journeyed through Arabia and Syria. In his twenty-fifth year his uncle recommended him as

agent to a rich widow, named Chadidja, and he acquitted himself so much to her satisfaction that she married him, and thus placed him in easy circumstances. She was fifteen years older than he, but he lived with her in happy and faithful wedlock. He seems to have had from his youth a propensity to religious contemplation, for he was every year accustomed, in the month Ramadan (q.v.), to retire to a cave in Mount Hara, near Mecca, and dwell there in solitude. Mahomet began his mission in the fortieth year of his age by announcing his apostleship to his own family. His wife was one of the first to believe in him, and among other members of his family who acknowledged his mission was his cousin Ali, the son of Abu Talib. Of great importance was the accession of Abu Bekr, a man of estimable character, who stood in high respect, and persuaded ten of the most considerable citizens of Mecca to join the believers in the new apostle. They were all instructed by Mahomet in the doctrines of *Islam*, as the new religion was styled, which were promulgated as the gradual revelations of the divine will, through the angel Gabriel, and were collected in the *Koran* (q.v.). After three years Mahomet made a more public announcement of his doctrine, but his followers were few for years. In 621 Mahomet lost his wife, and the death of Abu Talib took place about the same time. Deprived of their assistance he was compelled to retire for a time to the city of Taif. On the other hand, he was readily received by the pilgrims who visited the Kaaba (q.v.), and gained numerous adherents among the families in the neighbourhood. Mahomet now adopted the resolution of encountering his enemies with force. Only the more exasperated at this, they formed a conspiracy to murder him; warned of the imminent danger, he left Mecca, accompanied by Abu Bekr alone, and concealed himself in a cave not far distant. Here he spent three days undiscovered, after which he arrived safely at Medina, but not without danger (A.D. 622). This event, from which the Mahomedans commence their era, is known under the name of the *Hijra*, which signifies flight. In Medina Mahomet was well received; thither he was followed by many of his adherents. He now assumed the sacerdotal and regal dignity, married Ayesha, daughter of Abu Bekr, and as the number of the faithful continued to increase, declared his resolution of propagating his doctrines with the sword. In the battle of Bedr (623), the first of the long series of battles by which Islamism was established over a large portion of the earth, he defeated Abu Sofian, the chief of the Kuraish. He in turn was defeated by them at Ohod, near Medina, soon after, and in 625 they unsuccessfully besieged Medina, and a truce of ten years

was agreed on. Wars with the Jewish tribes followed, many Arabian tribes submitted themselves, and in 630 he took possession of Mecca as prince and prophet. The idols of the Kaaba were demolished, but the sacred touch of the prophet made the black stone again the object of the deepest veneration, and the magnet that attracts hosts of pilgrims to the holy city of Mecca. The whole of Arabia was soon after conquered, and a summons to embrace the new revelation of the divine law was sent to the Emperor Heraclius at Constantinople, the King of Persia, and the King of Abyssinia. Preparations for the conquest of Syria and for war with the Roman Empire were begun, when Mahomet died at Medina (632). His body was buried in the house of Ayesha, where he died, and which afterwards became part of the adjoining mosque, and a place of pilgrimage for the faithful in all time to come. Of all his wives, the first alone bore him children, of whom only his daughter Fatima, wife of Ali, survived him. There is no doubt that Mahomet was a man of extraordinary insight and deep reflection. Though without book-learning, he had a deep knowledge of man, was familiar with Bible narratives and Eastern legends, and possessed a grasp of the eternal ground of all religion, though tinged and modified by his vivid poetic imagination. See *Koran*; *Mahommedanism*.—BIBLIOGRAPHY: W. Muir, *Life of Mahomet*; D. S. Margoliouth, *Mohammed and the Rise of Islam*; E. Sell, *The Life of Mohammed*; *The Cambridge Medieval History* (vol. ii).

Mahommedanism, the name commonly given in Christian countries to the creed established by Mahomet. His followers call their creed *Islam* (entire submission to the decrees of God), and their common formula of faith is, "There is no god but Allah, and Mahomet is his prophet". The dogmatic or theoretical part of Mahommedanism embraces the following points: (1) Belief in God, who is without beginning or end, the sole Creator and Lord of the universe, having absolute power, knowledge, glory, and perfection. (2) Belief in His angels, who are imperishable beings, created of light. (3) Belief in good and evil jinn (genii), who are created of smokeless fire, and are subject to death. (4) Belief in the Holy Scriptures, which are His uncreated word revealed to the prophets. Of these there now exist, but in a greatly corrupted form, the *Pentateuch*, the *Psalms*, and the *Gospels*; and in an uncorrupted and incorruptible state the *Koran*, which abrogates and surpasses all preceding revelations (see *Koran*). (5) Belief in God's prophets and apostles, the most distinguished of whom are Adam, Noah, Abraham, Moses, Jesus, and Mahomet. Mahomet is the greatest of them all, the last of the prophets and

the most excellent of the creatures of God. (6) Belief in a general resurrection and final judgment, and in future rewards and punishments, chiefly of a physical nature. (7) The belief, even to the extent of fatalism, of God's absolute foreknowledge and predestination of all events both good and evil.

The practical part of Mahommedanism inculcates certain observances or duties, of which four are most important. The first is prayer, including preparatory purifications. Prayer must be engaged in at five stated periods each day. On each of these occasions the Moslem has to offer up certain prayers held to be ordained by God, and others ordained by His prophet. During prayer it is necessary that the face of the worshipper be turned towards the *kebla*, that is, in the direction of Mecca. Prayers may be said in any clean place but on Friday they must be said in the mosque. Second in importance to prayer stands the duty of giving alms. Next comes the duty of fasting. The Moslem must abstain from eating and drinking, and from every indulgence of the senses, every day during the month of Ramadan, from the first appearance of daybreak until sunset, unless physically incapacitated. The fourth paramount religious duty of the Moslem is the performance at least once in his life, if possible, of the pilgrimage (*el-Hajj*) to Mecca and the Hill of Arafat, after which he becomes a *Hajji*. Circumcision is general among the Mahommedans, but is not absolutely obligatory. The distinctions of clean and unclean meats are nearly the same as in the Mosaic code. Wine and all intoxicating liquors are strictly forbidden. Music, games of chance and usury are condemned. Images and pictures of living creatures are contrary to law. Charity, probity in all transactions, veracity (except in a few cases), and modesty are indispensable virtues. After Mahomet's death Abu Bekr, his father-in-law, became his successor, but disputes immediately arose, a party holding that Ali, the son-in-law of Mahomet, was by right entitled to be his immediate successor. This led to the division of the Mahommedans into the two sects known as Shiites and Sunnites. The former, the believers in the right of Ali to be considered the first successor, constitute at present the majority of the Mussulmans of Persia and India; the latter, considered as the orthodox Mahommedans, are dominant in Turkey, Arabia, Turkestan, and Africa. The total Mahommedan population of the world is estimated at fully 221,825,000 (1922). See *Caliph*; *Shiites*; *Sunnites*; *Muezzin*.

Mahony, Francis Sylvester, known as 'Father Prout', born at Cork 1804, died at Paris 1866. About 1834 he began the contribution of an amusing series of articles known as the *Prout Papers* to *Fraser's Magazine*. In 1846 he became

Roman correspondent to *The Daily News*, his letters being afterwards republished under the title of *Facts and Figures from Italy*. For the last twelve or fifteen years of his life he was Paris correspondent for *The Globe*. *Reliques of Father Prout* were published in 1836 and 1860, and *Final Reliques* in 1876.

Mala, in Greek mythology, one of the Pleiades, the daughter of Atlas and Pleione, and the mother of Hermes (Mercury).

Maldenhair, the name given to the *Adiantum Capillus-venérís*, a fern with a creeping scaly rhizome, and bipinnate fronds, the leaflets of which are between rhomboidal and wedge-shaped, margined with oblong sori, and more or less deeply lobed. It is found growing on rocks and walls in some parts of Britain, and possesses demulcent and mucilaginous properties.

Maldenhair Tree. See *Ginkgo*.

Maldenhead, a municipal borough of Berkshire, England. Its first charter dates from the reign of Edward III. Pop. (1921), 10,741.

Maldstone, a municipal borough and county town of Kent, on the Medway. The church of All Saints was formerly attached to a college of that name built by Archbishop Courtenay in the reign of Richard II, and suppressed by Edward VI. The archiepiscopal palace was also built by Courtenay. Fairfax took the town and suppressed a Royalist rising in 1648. Maldstone 'adopted' Montauban, France, in 1921. The town is in the hop-field area, but has also manufactures of paper, beer, and agricultural implements. Pop. (1921), 37,448.

Malmasingh, a district of the Dacca Division of Eastern Bengal, better known as Nasirabad (q.v.). Pop. 3,915,000.

Maimonides (mā-mon'i-dēz), properly *Moshe Ben Maimon Ben Joseph*, Jewish scholar, born at Cordova about 1131-9, died about 1201-9. He received an excellent education, studied Jewish and Arabic literature and Greek philosophy, attended the lectures of the Arabic philosophers, and studied medicine. He systematized the whole mass of Jewish tradition, and demonstrated the principles on which Judaism is based. His books were widely circulated in Europe by means of Latin translations. His best writings in Arabic are: *The Guide of the Perplexed*, an exposition of Judaism; *a Compendium of Logic*; *a Commentary on the Mishna*; *an Exposition of the 613 Laws of Moses*; &c. He wrote in Hebrew a complete system of the Talmudic Judaism.—**BIBLIOGRAPHY**: H. Graetz, *History of the Jews*; D. Yellin and I. Abrahams, *Maimonides*; see also M. Friedländer, *The Guide of the Perplexed*.

Main (mān), a river of Germany, which rises in the Fichtelgebirge, flows in a generally westerly direction for a distance of 300 miles, and joins the Rhine a little above the town of Mainz. It

is navigable for about 240 miles, and has been improved so as to admit the largest Rhine steamers (vessels of 1000 tons) to Frankfort.

Maine, Sir Henry James Sumner, English jurist, born 1822, died 1888. From Christ's Hospital he went to Pembroke College, Cambridge, where he graduated in 1844. He was appointed regius professor of civil law in the same university, 1847, and reader in jurisprudence at the Middle Temple, 1854. From 1862 to 1869 he was law member of the Supreme Council of India, and on his return home he was elected Corpus professor of jurisprudence at Oxford. In 1877 he became master of Trinity Hall, Cambridge. His chief works are: *Ancient Law in Connection with the Early History of Society, and its Relation to Modern Ideas*; *Village Communities in the East and West*; *The Early History of Institutions*; *Dissertations on Early Law and Custom*; *The Whewell Lectures on International Law*, delivered before the University of Cambridge, 1887. His works place him in the very front rank of modern philosophical jurists.

Maine, a north-eastern maritime state of the United States, bordering New Brunswick and Quebec, Canada, with its seaboard of 2500 miles on the Gulf of Maine. In the north the country is hilly (Mount Katahdin, 5385 feet), and an elaborate lake system is the result of erosion by the Laurentian glacier. The island-studded coast is deeply indented, and the state is traversed by several navigable rivers, principally the Penobscot and Kennebec, but all of them are harnessed for power. Lumbering is important in the afforested northern district; agriculture, quarrying, and fisheries are generally the principal occupations. Oats, maize, buckwheat, potatoes, and hay are the chief agricultural products. There are few minerals, felspar being the only one of any commercial importance. The State university (founded 1808) is located at Orono, and there are also colleges at Brunswick (founded 1794) and Lewiston. Augusta (q.v.) is the State capital, but Portland, the seaport, is by far the largest city. Maine covers an area of 33,040 sq. miles, and has a pop. of (1920) 768,014.

Maine was founded in 1622 by Sir Ferdinando Gorges, who, with John Mason, was granted land by the Government of New England. Eventually the state became part of Massachusetts (1692), but at last was made an independent state and admitted into the Union (3rd March, 1820). The present Government comprises a legislature of two Houses, the Senate (51 members), and the House of Representatives (151 members), both sitting for a limited period of two years, but for local government the state is divided into sixteen counties, subdivided into towns, cities, and some unincorporated places.—**BIBLIOGRAPHY**:

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Maine, a pre-Revolutionary province of France, lying immediately south of Normandy, and comprising the modern departments of Sarthe and Mayenne with parts of Orne and Eure-et-Loir. Le Mans was the capital. When Henry II ascended the throne of England in 1154, Maine passed to him from the Plantagenets. It was wrested from John by Philip Augustus in 1204.

Maine de Biran (mān-dē-bērān), François Pierre Gonthier, French philosopher, born 1706, died 1824. His chief philosophical essays are: *Influence de l'habitude*, *Sur la décomposition de la pensée*, *Sur l'aperception immédiate*, and *Rapports du physique et du moral*. Maine de Biran's importance as a philosopher is chiefly due to his giving the direction to philosophic speculation afterwards developed in the school founded by Victor Cousin.

Maine-et-Loire, a north-western department of France, part of pre-Revolutionary Anjou; area, 2811 sq. miles; pop. (1921), 473,780. It is generally hilly, and is traversed centrally from east to west by the Loire, which receives within the department the Maine, comprising the united streams Loir, Sarthe, and Mayenne. Other rivers are the Authion and Layon. Quarrying (slate, freestone, and granite) is an extensive industry, slate being confined to the district around the capital, Angers (q.v.). Agriculturally the department produces flax, beet, wheat, and oats; the vine is also cultivated. Angers is the chief town and railway centre; Baugé, Saumur, Cholet, and Segré are of importance.

Maintenance, in law, an unlawful intermeddling in a suit, by assisting either party with money, or otherwise, to prosecute or defend it. This is prohibited by the English law. A man may, however, maintain the suit of his near kinsman, servant, or poor neighbour with impunity, and any suits in which he has an actual interest. The law seeks to prevent only harsh and vexatious intermeddling.

Maintenon, Françoise d'Aubigné, Marquise de, second wife of Louis XIV, was born in 1635, and died in 1719. She returned to France from Martinique in 1645, and promptly married (1651) the aged and deformed but celebrated wit and poet Scarron. On his death in 1660 she was left in straitened circumstances, and although aided by Anne of Austria, the 'widow Scarron', as she was contemptuously called by her enemies, was glad to accept the post of *gouvernante* to the children of Louis XIV and Madame de Montespan (1669). Maintenon played her cards well; beloved by her charges and admired no less for her wit than for her beauty, she was created Marquise in 1678, and from that time was known as 'Madame' de Maintenon. In 1680 Louis

discarded Montespan, his mistress, and upon the death of the queen he was secretly married to Maintenon (1685), who became his adviser, and was indispensable to him. She was a devout, bigoted *pro-clerical*, ambitious and resolute, and the period of her influence coincides with an unfortunate increase in religious persecution.—Cf. C. C. Dyson, *Madame de Maintenon: her Life and Times*.

Mainz (Fr. *Mayence*), a town of Germany, in the Republic of Hesse, on the Rhine opposite the mouth of the Main. The Rhine is bridged, and Mainz is connected with Kastel (*Castellum Mattiacorum* or the Romans), on the opposite bank. The town has a lively shipping and general river trade, and is an important railway junction. Mainz Cathedral was founded in A.D. 978, but has been many times burned and restored; it has three choirs and six towers. The ancient castle of the Electors, built between 1627 and 1678, houses both Roman and Germanic antiquities, and the Gutenberg Museum (1901). Mainz was the Roman *Moguntiacum*, and was founded by Drusus (13 B.C.), to whom a concrete tower, called the *Eigelstein*, which stands in the citadel and on the site of the ancient Roman camp, is said to have been erected. In 747 the town was made an archbishopric under Saint Boniface, and Mainz was long the first ecclesiastical city of Germany, of which its Archbishop-elect ranked as the premier prince. Mainz was ceded to France in 1801 (Peace of Lunéville), and in 1803 the archbishopric was abolished. In 1814 the town was retaken and definitively incorporated in the Grand-Duchy of Hesse (1816). Once highly fortified, Mainz is one of the German fortress towns dismantled under the Treaty of Versailles. Pop. (1919), 107,930.

Maitland, Sir Richard (Lord Lethington), Scottish poet, lawyer, and statesman, born 1406, died 1586. He studied at St. Andrews and in France. In 1531 he took his seat on the Bench as an extraordinary Lord of Session. In 1500 he became blind. In 1521 he was appointed an ordinary Lord of Session, and assumed the title of Lord Lethington. From 1562 to 1567 he held the office of Lord Privy Seal. He made a celebrated collection of early Scottish poetry. *Ancient Scottish Poems*, selections from Maitland's collection, were published by John Pinkerton in 1786. The Maitland Club, named after him, published a volume of his own poems in 1830.

Maitland, William, commonly known as Secretary Lethington, a Scottish statesman, eldest son of Sir Richard Maitland, born about 1528, died 1573. In 1558 he was appointed Secretary of State by Mary of Guise, the Queen-Regent. In the following year he joined the Lords of the Congregation. On Queen Mary's arrival in Scotland he was chosen one of her

principal ministers. After Darnley's murder he conspired to effect Mary's escape from Lochleven. He fought against her at Langside, but the Regent Moray, suspecting his good faith, had him arrested in 1560 as an accessory to Darnley's murder. After the assassination of Moray he became the life and soul of the queen's party. In 1571 he joined Kirkcaldy in Edinburgh Castle; was proclaimed a traitor by the Parliament, and attainted with his two brothers. He died in prison in Leith.—Cf. E. Russell, *Maitland of Lethington: a Study of his Life and Times*.

Maitland, a town of New South Wales, 95 miles north of Sydney, on the Hunter River. It comprises two distinct municipalities, East Maitland and West Maitland, connected by rail and tram. It was situated in a very fertile agricultural district, which is now devoted to coal-mining. Pop. East Maitland, 3100; West Maitland, 9300.

Maize (Sp. *maiz*, from Haytian *mahiz*, the native name of the plant), Indian corn, a genus of plants commonly cultivated in the warmer parts of the world, where it answers a purpose



Maize (*Zea Mays*)

similar to that of wheat in more northern countries. The common maize or Indian corn is the *Zea Mays* of botanists, a monœcious grass, of vigorous growth, with stems not more than 2 feet high in some varieties, and reaching the height of 8 or even 10 feet in others. The grains are large, compressed, and packed closely in regular parallel rows along the sides of a receptacle many inches long. In large varieties the ear or cob is often 1 foot long and 2 or 3 inches in thickness. Maize is extensively cultivated in America, where it forms almost the only bread

eaten by many of the people. Its flour, though exceedingly nourishing, is not glutinous, and must accordingly be mixed with wheat, rye, or other flour before it can be baked. In America large quantities of unripe grain are roasted till they split, and are then eaten under the name of *pop-corn*. From the green stems a syrup is expressed, which is fermented and converted into a kind of spirits. Paper has been made from maize fibres. It is also cultivated throughout a great part of Asia and Africa, and in several countries of the south of Europe, as Spain and Italy. The green stems and leaves form nutritious food for cattle, and in Great Britain it is sown and cut green for this purpose. *Z. Curagua*, a smaller species, is the Chile maize or Valparaiso corn.

Majesty (Lat. *majestas*), a title belonging to kings and queens. In England Henry VIII first adopted the title, and at present all emperors and kings are addressed as 'your majesty'. The former kings of France were addressed as 'most Christian majesty', the kings of Spain as 'most Catholic majesty', the former kings of Portugal as 'most faithful majesty', and the former kings of Hungary as 'apostolic majesty'. The former emperors of Germany and Austro-Hungary had the title of 'imperial-royal majesty'. In England the full title is: *His most Gracious Majesty*.

Major, in the British service, the commissioned rank next below that of lieutenant-colonel; the junior grade of field-officer. The origin of the word is curious and is as follows. In the Middle Ages, when fighting was a profession of some profit, and troops were raised as required for a particular service, the commander of any given body was invariably a knight, and the rank and file (if a modern expression be permitted) were engaged to serve him personally. Out of these personal retainers the knight, for convenience of command, selected certain men as his assistants or 'servientes' (sergeants), to whom he issued his orders. In course of time a superior rank of 'serviente' or sergeant, known as the sergeant-major, grew up, who acted as the link between the knight or commander and his subordinates, the sergeants; in other words, the sergeant-major became the second-in-command of the unit. In time the prefix sergeant was dropped, and the second-in-command became the major. (The present-day sergeant-major is a warrant-officer, and as such senior to all non-commissioned officers).

Major, in music, designates in general a larger in contradistinction to a smaller interval of the same denomination, called a *minor* interval; thus a *major tone* is the interval between two tones having the proportion to each other in number of vibrations of 8 : 9; a *minor tone* the interval between two tones in the ratio of 9 : 10;

a *major third* is an interval of two tones (major and minor); a *minor third* an interval of a tone and semitone. The *major mode* is one of the two recognized modern modes (or forms of the scale), in which the first third in the scale is a major third, in contradistinction to the *minor mode*, in which the first third is a minor third.

Major'ca (Sp. *Mallorca*), the ancient *Bulgaris Major*, a Spanish Mediterranean island, the largest of the Balearic group; area, 1325 sq. miles. Divided by a mountain chain running from north-east to south-west, the island rises steeply from the sea on the west and north; elsewhere the coasts are low and shelving. The climate is temperate, and, since the drainage of the malarial *Albufera Morass* at Alcudia, the island has been fairly healthy. Oranges, figs, wine, and subtropical cereals are produced; coal is mined, slate and marble are quarried, and precious stones are found. Palma, the capital, is in railway communication with Manacor, Inca, La Puebla, Alcudia, and Felanitx. Pop. 248,000. See *Balearic Islands*.

Makó, a town of Csanád, Hungary, near the Maros River, on the frontier line of Hungary, Yugo-Slavia, and Roumania, 10 miles east by south of Szegedin (Szeged). Pop. 34,918.

Malabar', a maritime district of Madras, India, on the west coast; area, 5795 sq. miles. A great portion is comparatively low, intersected by narrow ravines, covered with forests and jungle, and watered by innumerable streams. The annual rainfall is over 100 inches. Rice, coffee, rubber, and coco-nuts are produced. The principal towns are Calicut (the largest), Cannanor, and Tellicherry. Pop. about 3,000,000. The name Malabar is often applied to the whole extent of coast country as far north as Bombay. Malayalam is the language of the coast. It is Dravidian, and an offshoot from Tamil, dating back to the ninth century.

Malabar Plum. See *Rose-apple*.

Malac'ca, a British maritime territory in the Straits Settlements, lying between Singapore and Penang, and extending for 42 miles along the shores of Malacca Strait, the channel separating the Malay Peninsula from Sumatra. Area, 500 sq. miles. The seaboard is low-lying, and the annual rainfall is heavy. Rubber is the staple product. Pop. about 100,000.

Malacca, capital of the above territory, lies on Malacca River, and has a railway connection with Tumpin and the Federated Malay lines. The town is one of the oldest European settlements in the East. It was taken by the Portuguese in 1511, held by the Dutch from 1641 until taken by the British in 1795, and restored to Holland in 1818. It was regained by Britain in exchange for Bencoolen and Sumatra in 1824.

Malachi (mal'a-ki), the twelfth and last of

the minor prophets. Nothing is known of his history, and it is even doubtful if Malachi (Messenger of Jehovah) be a proper name or an assumed epithet. The book evidently belongs to the latter part of the governorship of Nehemiah, about 420 B.C. It contains denunciations of the sins of the Israelites, and predicts the coming of the Messiah and the conversion of the Gentiles.

Malachite (mal'a-ki't), a carbonate and hydroxide of copper, $\text{CuCO}_3 \cdot \text{Cu(OH)}_2$, of an emerald-green colour, and of a laminated, fibrous, or massive structure. The finest specimens are obtained from Siberia, but it is found in many places all over the world, and in films in nearly all copper-mines. Fibrous malachite, when finely pulverized, is used as a paint; massive malachite is made into boxes, knife-handles, table-slabs, and other ornamental articles, and is susceptible of a beautiful polish. The allied mineral azurite contains a larger proportion of copper carbonate, and is blue; the two minerals are sometimes associated in alternating zones.

Malacop'teri, or **Malacopterygii** (-tér-ij'i-i), a name given to those osseous fishes which are distinguished by all the rays of the fins being soft (except in a few individuals), exhibiting minute articulations, and often divided into small fibres at their extremities. They are divided into two sub-orders, the Malacopteri (proper) and the Anacanthini. They include the carp, salmon, pike, herring, cod, turbot, and other flat-fish, and the eels. See *Ichthyology*.

Malacos'traca, a sub-class of crustaceans divided into two primary groups, sessile-eyed and stalk-eyed, the latter including the shrimps, lobsters, crabs, &c., and the former the woodlice, sandhoppers, &c.

Mal'aga, a maritime province of Southern Spain, on the shores of the Mediterranean, and a part of the ancient Kingdom of Granada. It is traversed in all directions by spurs of the Sierra Nevada, and is therefore exceedingly hilly; but the climate is warm and equable, and cereals, muscatel grapes, oranges, figs, almonds, lemons, and sugar-beet are abundant in the well-watered valleys. Iron and lead are found, and there is a large coastal fishery business. Area, 2812 sq. miles; pop. (1920), 527,249.

Malaga, capital of above province; a seaport at the mouth of the Guadal Medina, and on Malaga Bay, an arm of the Mediterranean. The Guadal Medina (Ar., 'river of the city') dries up in summer, but is a raging torrent during the winter months. Oranges, figs, almonds, melons, pomegranates, and lemons abound in the vicinity, and with raisins and wine are exported from the commodious, mole-protected harbour. Of immemorial antiquity, Malaga is the oldest and

most famous seaport on the Mediterranean. It was founded by the Phœnicians, and was the ancient *Malaca*. Scipio made it a *municipium*; Leovigild, King of the Visigoths, took it from the Byzantines in A.D. 571; and Tarik with his Berbers conquered it in 711. Malaga was one of the finest seaports of Granada in the thirteenth century. Ferdinand and Isabella captured it after an obstinate siege in 1487 (war of Granada). Pop. (1918), 141,046.

Malaria (ague, remittent fever, jungle fever) is a specific fever of protozoal origin, the infection of which is transmitted by the anopheline mosquito. It is characterized by the periodicity of the attacks, enlargement of the spleen, and the rapid response to quinine treatment. It has been known since early times, and reference is made in old Indian medicine to fever spread by mosquitoes, while Hippocrates and other ancient writers have described several types of the fever and emphasized the relationship between malaria and marshy districts.

The bite of an anopheline mosquito, infected by the parasite, causes malaria in persons otherwise unexposed to the disease, and, once infected, a person may have recurring attacks for an indefinite period.

The disease is widely distributed all over the tropics and subtropical regions, and is also found in many parts of the temperate zones. The incubation period is generally eight to ten days, but may vary considerably. The patient may feel out of sorts for a few days before an attack, or there may be no prodromal symptoms. He suddenly feels very cold and soon begins to shiver, with chattering teeth, blue lips, and coldness of the extremities. This 'cold' stage lasts from ten to thirty minutes, and gradually the chill diminishes, to be replaced by a feeling of warmth, which soon becomes a burning heat with much discomfort. This 'warm' stage lasts from four to five hours, and is followed by profuse sweating and considerable prostration. In the tertian type of the disease, at the end of forty-eight hours another attack develops similar to the first, and in the quartan type the second attack occurs on the fourth day. In the malignant type the feverish period lasts about twenty-four hours, and is more severe, while it may reappear after only twenty-four hours remission.

Various atypical forms are described, in some of which the patient is comatose, in others delirious, while almost any organ of the body may be specially affected, and the symptoms vary accordingly.

Nearly all cases respond rapidly to suitable quinine treatment, and the drug should be continued in decreasing doses for at least three months after the last attack of fever. Beyond the administration of quinine, suitable nursing and

dietetic treatment are indicated, and any of the special symptoms that may arise should be treated. Prevention is primarily anti-mosquito measures, and secondarily the preventive administration of quinine. All the pools and ponds near houses, camps, &c., should be oiled with crude petroleum in order to destroy the larvæ, and mosquito-nets and masks should be used in dwelling-houses. The preventive use of quinine is not so important as the anti-mosquito measures, but the two should be carried out together to ensure the effective control of the disease.

Malatia (ancient *Mellitênê*), a town of Kurdistan, Asia Minor. Pop. about 82,000.

Malaya, the political nomenclature applied to the Malay Peninsula and Archipelago generally, but technically only as inclusive of the Straits Settlements, Federated Malay States, and the protected but unfederated states of Johore, Kedah, Kelantan, Perlis, and Trengganu.

Malay Peninsula, the most southern extension of continental Asia, stretching south and then south-east to Singapore from Siam and Burmah, to which the Kra Isthmus connects it; extreme length, 700 miles. The interior is traversed by afforested mountains, of which several peaks attain 7000 feet altitude (Hulu Temengor, 7020 feet; Kerbau, 7100 feet). Teak, sandal-wood, and ebony are yielded by the forests. The coasts are low and somewhat swampy; the climate is generally humid, but equable and not unhealthy; the rivers are numerous but short. Wolfram and coal are found; coco-nuts, rice, and sugar are produced; but the staple occupations of the native Malays are tin-mining and rubber cultivation. The Malay States Government railway system extends throughout the peninsula, and affords railway connection with the Siamese railways at Ootapao, and with Bangkok, the Siamese capital. Only the southern and larger half of the peninsula and a coastal extension of Burmah on the Bay of Bengal are British. A projection of Siam separates Lower Burmah from the Gulf of Siam on the east, and, by expanding to occupy the neck of the peninsula, divides it from British Malaya in the south. The inhabitants are mainly Malays and Malayo-Siamese, with some immigrant Chinese and Tamils who labour in the plantations.—*Cl. A. H. Keane, Malay Peninsula.*

Malay Archipelago, the great inland group which separates the Pacific from the Indian Ocean in the vicinity of the Malay Peninsula. The Dutch possessions are termed *Dutch East Indies* (q.v.). Timor is in part Portuguese, who also hold Pulo Cambing and the territory of Ambino, the whole being known as Timor. Among products are coffee, sandal-wood, and wax. Dilly (Delhi) is the chief port. Pop. of colony, about 377,000.

Federated Malay States, a federation of four states of the Malay Peninsula, comprising Perak, Selangor, Negri-Sembilan, and Pahang, each of which is ruled by a Sultan advised by a British Resident. The combined states are supervised by the British High Commissioner. See *Perak*.

Malay States.—The states not included in the Federation are as follows:

	Area, Sq. Miles.	Population.
Johore	7500	180,000
Kelantan	5040	287,000
Kedah	3800	240,000
Trengganu	6500	115,000
Perlis	316	33,000

The inhabitants are Siamese, Malays, and Chinese. Rubber, copra, betel-nut, rice, coco-nuts, tapioca, sugar-cane, maize, teak and valuable wood, tin, wolfram ore, and some other minerals are produced. Mahommedanism is the prevailing religion, and trade is chiefly with the Straits Settlements.—BIBLIOGRAPHY: W. A. Graham, *Kelantan*; H. C. Robinson and C. B. Cross, *The Natural History of Kedah Peak*.

Malays, a race of people inhabiting Malaya and the whole Asiatic Archipelago from Madagascar to the Philippines, numbering upwards of 50,000,000. They are of Mongoloid stock, and claim to have originated in the highlands of Sumatra. The language, of the Malayo-Polynesian family originally, is agglutinative in character, and is the *lingua franca* of the Eastern Archipelago. Essentially a maritime family, they have never settled inland excepting in primeval Sumatra; they are impulsive and easygoing, but of exceptional native intelligence. The prevailing religion is Sunnite Mahommedanism. Physically the Malays are rather under middle height, light-brown in colour, with straight, black hair, black and slightly oblique eyes, and high cheek-bones. The beard is scanty or non-existent. See *Madagascar*.—Cf. W. W. Skeat, *Tribes of the Malay Peninsula*.

Malcolm, the name of four kings of Scotland (q.v.).

	Surname.	Reigned.	
Malcolm I.	MacDonald	943-954	Son of Donald VI.
Malcolm II	MacKenzie	1005-1034	Son of Kenneth III.
Malcolm III	Canmore	1058-1093	Son of Duncan I.
Malcolm IV	the Maiden	1153-1165	Grandson of David I.

Malden, a city of Massachusetts, United States, in Middlesex county. It stands on Malden River, and is a suburb of Boston, from which it is 5 miles distant. Formerly it was

included in Charlestown, but was incorporated in 1649 and became a city in 1881. As a manufacturing town the industries are many and varied. Pop. (1920), 49,100.

Malden Island, a British island in the Pacific (4° s. lat., 155° w. long.), of coralline structure, with coco-nut trees and valuable guano deposits. It is under the jurisdiction of the High Commissioner of the Western Pacific. Area, 85 sq. miles; pop. 168.—Cf. W. T. Brigham, *Index to the Islands of the Pacific*.

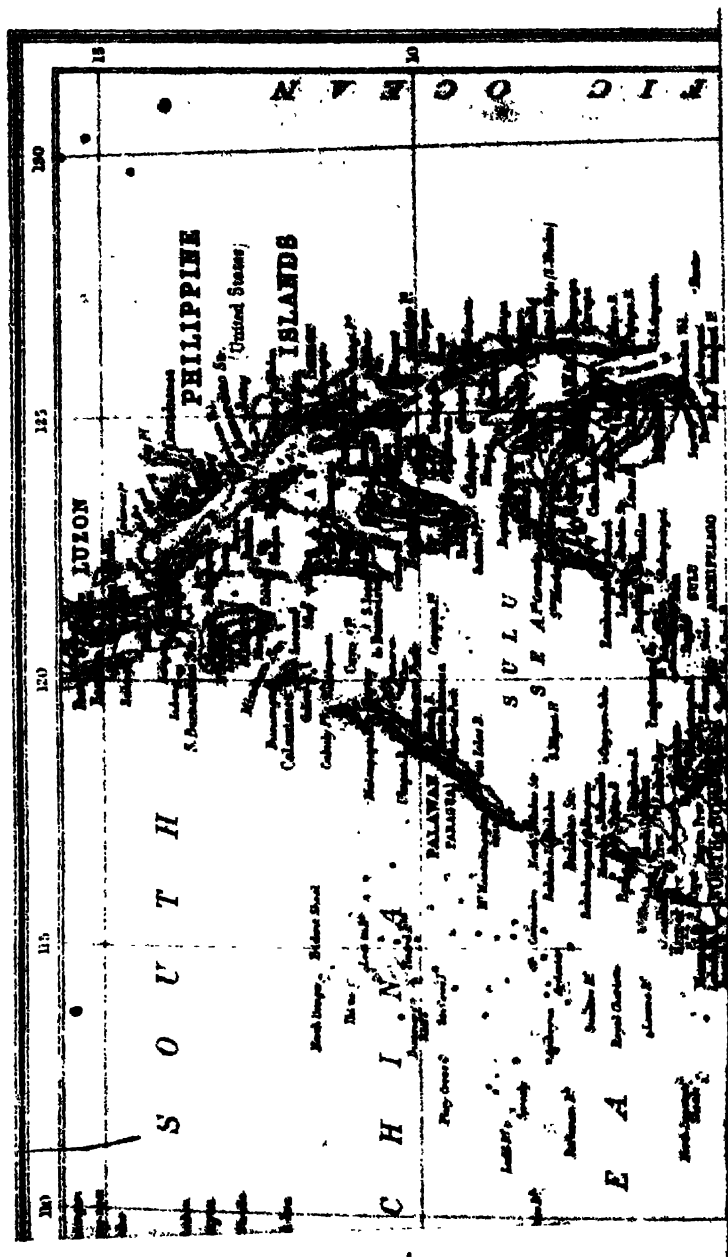
Maldiv Islands, a chain of nineteen (politically thirteen) coral islets in the Indian Ocean, 400 miles west of Ceylon, to which island their Sultan pays tribute. The Sultanate is elective, and the administrative centre is Malé Island. The larger atolls are richly clad with coco-nut palms, and produce millet, fruit, edible roots and nuts, and the waters abound in bonito fish. The natives are mainly engaged in fishing and trading. Mahommedanism is the recognized religion. Pop. 70,000.—Cf. J. S. Gardiner, *Fauna and Geography of the Maldiv Archipelago*.

Maldon, a municipal borough and river-port of Essex, England, on the Blackwater estuary. During the Danish invasions Maldon was a Saxon stronghold, and was twice taken (921 and 993). It received a charter from Henry II, and returned two members to Parliament from Edward III until 1807. Near the town are the ruins of Beleigh Abbey. Pop. (1921), 6589.

Maldonado, a maritime department of Uruguay facing the La Plata estuary. It is flat and agriculturally prosperous. Stock-raising is extensive. Area, 1587 sq. miles; pop. (1919), 41,885.—**Maldonado**, on the coast, east of Monte Video, is capital of the department. It possesses a fine harbour.

Malebranche (mál-bränsh), Nicolas, a French philosopher, born in 1638, died 1715. He studied theology and philosophy at the colleges of La Marche and of the Sorbonne, and at the age of twenty-two he was admitted into the congregation of the oratory. In 1673 he published his treatise *De la recherche de la vérité*. The doctrines of this work are founded upon Cartesian principles, and are in some particulars Platonic,

Malebranche conceiving ideas to be the immediate objects of perception. Among his other writings are *Conversations métaphysiques et chrétiennes*, *Traité de la nature et de la grâce*,



Méditations métaphysiques et chrétiennes, and *Traité de morale*.—Cf. H. Joly, *Malebranche*.

Malesherbes (mâl-zerb), Chrétien Guillaume de Lamignon de, French statesman, the son of Guillaume de Lamignon, Chancellor of France, was born at Paris in 1721, died 1794. Aided by Tronchet and Desèze, he acted as leading counsel for Louis XVI at his trial before the Convention. Acts of loyalty far less decided were in that day the sure road to destruction. He was condemned to death and guillotined.

Malherbe (mâl-erb), François de, French poet, born at Caen 1555, died 1628. He was the protégé of Henry IV; wrote light lyrics, odes, and epigrams; and so far as form is concerned he may be considered the father of French classical poetry.

Malibran (mâ-lê-brân), Maria Felicità, one of the greatest singers of the nineteenth century, born at Paris 1808, died in 1836. She made her début in 1825 at the opera in London. Among the operas in which she played were *Othello*, *The Barber of Seville*, *Don Juan*, and *Romeo and Juliet*. She excelled both in tragic and comic parts, and was no less accomplished as an actress than she was as a singer.

Mallic Acid ($C_4H_6O_5$), a dibasic acid found in many fruits, particularly in the apple; hence the name, from Lat. *malum*. It is most easily obtained from the fruit of *Pyrus Aucuparia* (mountain-ash or rowan tree), immediately after it has turned red, but while still unripe. It is very soluble in water, and has a pleasant acid taste.

Malice, in law, a formed design or intention of doing mischief to another, called also *malice prepense* or *aforethought*. It is *express* when the figured design is evidenced by certain circumstances discovering such intention; and *implied* when the act is done in such a deliberate manner that the law presumes malice, though no particular enmity can be proved. *Malicious mischief* is the committing of an injury to public or private property from sheer wantonness or offence. This offence is punishable with great severity. A *malicious prosecution* is a prosecution brought against a person maliciously and without reasonable cause. From the mere want of probable cause malice may be inferred.

Malines, or **Mechlin** (the mediæval *Machlina*), a town of Antwerp, Belgium, on the Dyle, with large railway workshops and some manufactures, notably of lace. It is an important railway junction. In 1546 the town was made an archbishopric, the holder being primate of the Netherlands, and at the present time Malines is the ecclesiastical capital of Belgium. The cathedral of S. Rombold (1812, rebuilt fourteenth to fifteenth century) and the Cloth Hall (1320) are the most important historical buildings.

During the European War Malines was bombarded by the Germans on three distinct occasions (Aug.-Sept., 1914) and greatly damaged. Pop. (1920), 58,860.

Malleability, the property of being susceptible of extension by rolling or beating; almost restricted to metals. The following is the order of malleability of the metals: gold, silver, aluminium, copper, tin, platinum, lead, zinc, iron, nickel. Ductility and malleability are nearly allied, but they are seldom possessed in the same proportion by the same metal.

Malleco, an inland province of Chile. It is an agricultural and stock-raising district, but lumbering is also extensive. Angol is the capital. Area, 3303 sq. miles; pop. (1919), 139,166.

Mallow (*Malva*), a genus of plants of the nat. ord. Malvaceæ. *M. sylvestris* (the common mallow) is a common and widely diffused species. When fresh the flowers are reddish-purple, but on drying they become blue. The mucilaginous and demulcent properties of the plant make it useful in pharmacy. The dwarf mallow (*M. rotundifolia*) is also a native of Britain. Its stems are short and simple, spreading widely from a long, deeply buried root. Its leaves are of a handsome, round, heart-shaped form, somewhat lobed and crenate on their edges; the flowers white, violet-white, or purplish. The musk mallow (*M. moschata*) is also found in Britain; it has handsome, deeply cut leaves, which diffuse a pleasant rosy odour, and large rose-coloured flowers. The fibre of *M. crispus* is sufficiently tenacious to be used in making cordage.

Mallow, a town of County Cork, Ireland, on the Blackwater. Remains of the ancient stronghold of the Earls of Desmond (destroyed 1641) are still extant. It is a railway junction and agricultural centre. Pop. 4300.

Malmédy, a district and town of Belgium, formerly in Rhenish Prussia, on the Warche, in a basin surrounded by hills. The district was ceded to Belgium in accordance with the Treaty of Versailles (1919). Pop. of district, 37,000.

Malmesbury (mâlmz'be-ri), a town of England, county of Wilt, on an eminence, 23 miles N.E. of Bristol. It is well built, and has the remains of an abbey founded in the sixth century. It was a parliamentary borough till 1885. Pop. (1921), 2405.

Malmesbury, William of, an English historian, born probably in Somersetshire about the year 1075, died about 1143. He received his education at the Benedictine Abbey of Malmesbury, and subsequently became librarian and precentor of the abbey. His *De Gestis Regum Anglorum* is a general history of England from the arrival of the Saxons in 449 to 1128; he also wrote a history from that year to 1143;

De Gestis Pontificum Anglorum; and *Antiquities of Glastonbury*.

Malmö (mål'meu), a seaport and third town of Sweden, situated on The Sound opposite Copenhagen (16 miles distant). Malmö was the chief commercial town on The Sound in mediæval times, but declined in the sixteenth-seventeenth century owing to the failure of the herring fishery and the growing importance of Copenhagen. The foundation of the new harbour (1775-8) restored the town to its former commercial importance. Pop. (1920), 111,930.—The län of *Malmöhus* is the southernmost county (län) of Sweden. Malmö is the capital. Area, 1871 sq. miles; pop. 481,631.

Malone', Edmund, a commentator and editor of Shakespeare, was born at Dublin in 1741, died 1812. He published an edition of Shakespeare with notes in 1790, *Remarks on the Rowley (Chatterton) Controversy*, and an *Inquiry into the Ireland Shakespearian Forgeries*.

Malory, Sir Thomas, born probably about 1430. His compilation, the *Morte d'Arthur*, was first printed by Caxton in 1485. Malory is supposed to have been a Welshman, but all that is known of him is that he was a knight, and finished the book about 1470.

Malpighi (mal-pé'gë), Marcello, Italian physician and anatomist, born 1628, died 1694. He was successively professor of medicine at Bologna, Pisa, and Messina. In 1691 he became physician to Pope Innocent XII. His works relate to anatomy, physiology, and vegetable anatomy.

Malpighiaceæ, a considerable natural order of polypetalous dicotyledons consisting of tropical shrubs, trees, and climbers. Glandular sepals, clawed petals, and a trilobular ovary with oblique symmetry are among their distinctive features. The type-genus is *Malpighia*; the fruits of *M. urens* (Barbados cherry) are eaten in the West Indies.

Malplaquet (mal-plä-kä), a village in the French department of Nord, on the Belgian frontier, 26 miles S.E. of Valenciennes, celebrated for the defeat of the French under Villars by the allied British and Austrian troops under Marlborough and Prince Eugene, 11th Sept., 1709.

Malt, grain, usually barley, steeped in water and made to germinate, the starch of the grain being thus converted into saccharine matter, after which it is dried in a kiln, and then used in the brewing of porter, ale, or beer, and in whisky distilling. One hundred parts of barley yield about ninety-two parts of air-dried malt. See *Bracing*.

Malta (ancient *Melita*), a British Mediterranean island, some 58 miles south of Sicily and 180 miles from the coast of Africa, forming with the adjacent islands of Gozo (ancient *Gaulos*) and Comino (practically uninhabited) a Crown

colony. Malta proper is 17 miles long; area, 91½ sq. miles. Gozo has an area of 26 sq. miles. The total area of the colony is 118 sq. miles, and the population about 225,000. For Britain Malta's chief value is strategic. About 9000 troops are constantly in garrison. It is a naval base, a coaling-station, and a fortress. The chief town is Valetta, which a railway 8 miles long connects to the old capital, Citta Vecchia. The Maltese are of mixed extraction, and their language (*lingua Maltese*) is a corrupted jargon of Arabic intermixed with Italian. English is the official language of the colony, but Maltese is permitted in elementary schools, and Italian is the *lingua franca* of the law courts. The Maltese are invariably bi-lingual or polyglot. The staple industry of Malta is agriculture, and upon a thin soil on a mere rock rising steeply from the sea oranges, lemons, mandarines, onions, cumin-seed, corn, and cotton are produced in profusion. The temperature varies from 61° F. in January to 95° F. in August. Lace, cotton, fligree, and cigarettes are manufactured. There is a State university at Valetta, a Roman Catholic institution under Government control.

Malta was colonized successively by the Phœnicians, Greeks (736 B.C.), and Carthaginians (400 B.C.), from whom it was taken in 218 B.C. by the Romans. In A.D. 61 St. Paul was shipwrecked on the north coast of Melita (*Acts*, xxviii, 1-11). Malta was in turn conquered by the Vandals (454), Goths (464), Belisarius (533), Moors (870), and Count Roger of Sicily (1090). The Emperor Charles V in 1530 presented it to the Knights of St. John, then expelled from Rhodes. The knights defended it against the Sultan Suleiman II from 19th May to 11th Sept., 1565. Napoleon took Malta (17th June, 1798) on his way to Egypt. It was recaptured by the British in Sept., 1800, and definitively allocated to Great Britain in 1814 (Treaty of Paris). An elected legislature with certain 'reservations' controls purely local affairs. The Senate comprises seventeen members and the Legislative Assembly thirty-two, but the responsible ministry has only seven members. The 'reservations', e.g. imperial interests, coinage, treaties, &c., are controlled by the Governor and commander-in-chief, assisted by an Executive Council (nominated, not elected) comprising the Lieutenant-Governor, a legal adviser, and three officers representing the army, the navy, and the air force.—**BIBLIOGRAPHY**: R. H. Bradley, *Malta and the Mediterranean Race*; T. A. Keble, *Malta: its Charm and Worth*.

Malthus, Thomas Robert, English political economist, born 1766, died 1834. He studied at Jesus College, Cambridge, became Fellow of his college, took orders and held a small living

in Surrey. In 1805 he was appointed professor of history and political economy in the East India Company's college at Haileybury, an office which he held till his death. In 1798 he first published the views with which his name is associated in his *Essay on the Principle of Population as it Affects the Future Improvement of Society*. It was improved in subsequent editions. His leading principle is that population, when unchecked, goes on increasing in a higher ratio than the means of subsistence can, under the most favourable circumstances, be made to increase; that the great natural checks to excessive increase of population are vice, misery, and moral restraint; and the great business of the enlightened legislator is to diminish the first two and give every encouragement to the last.—Cf. J. Bonar, *Malthus and his Work*.

Malva*cæ*, the mallows, a large natural order of polypetalous dicotyledons, having monadelphous stamens, unilocular anthers, valvate aestivation, and often an external calyx (epicalyx) or involucre. A large proportion of the order consists of herbaceous or annual plants, inhabiting all the milder parts of the world, but found most plentifully in hot countries. Several species are of essential service to man. As emollients they are well known in medical practice. The hairy covering of the seeds of the various species of *Gossypium* forms raw cotton. The inner bark of many species yields fibre of considerable value. Many species of *Althæa*, *Sida*, and *Hibiscus* are splendid flowering plants. See *Mallow*.

Malvern, Great, a fashionable watering-place and health-resort of England, county of Worcester, on the eastern side of the Malvern Hills, embracing Malvern, Malvern Link, and Malvern Wells. It has many mansions, large hydropathic establishments, several mineral springs, a church once part of an eleventh-century Benedictine priory, and Malvern College, one of the great public schools. Pop. 17,809.

Malvern Hills, a range of England, on the borders of Worcester and Hereford shires. It extends north and south for about 9 miles, and attains an altitude of 1395 feet.

Malwa, a group of native states, in the Central India Agency, producing wheat, hemp, sugar, some opium, and native cereal foodstuffs. Area, 2727 sq. miles; pop. about 880,000.

Mamelukes, the former mounted soldiery of Egypt, consisting originally of Circassian slaves. As early as 1254 they became so powerful that they made one of their own number Sultan, this dynasty continuing till 1517, when it was overthrown by Selim I. They still continued to be virtual masters of the country, however. They suffered severely in opposing the French at the end of the eighteenth century, and in 1811

Mehemet Ali caused a general massacre of them throughout Egypt.

Mametz, a village of France, in the department of Somme, near Albert. During the European War, Mametz-Fricourt formed a strongly organized position taken by the British (7th division), 1st July, 1916. The wood, occupying about 220 acres and traversed partially by a German light railway, was captured on 10th–12th July, 1916. In the German offensive of March, 1918, the positions were again lost, but were eventually retaken. Mametz was 'adopted' by Llandudno.

Mamma*lia* (Lat. *mamma*, a breast), the highest class at once of the Vertebrata and of the animal kingdom, including those warm-blooded animals we familiarly term 'quadrupeds', the whales and other fish-like forms, and man himself. Their distinctive characteristic is that the female suckles the young on a secretion peculiar to the class, furnished by the mammary glands of the mother, and known as milk. Testes are present except in Monotremes. The skin is always more or less covered with hairs, which are found in many forms, from the finest wool or silky down to large coarse bristles and even spines. The cavity of the thorax or chest is bounded by the ribs, which vary greatly in number, but generally correspond to that of the thoracic vertebrae. The skull forms a single piece composed of bones immovably united together, to which is articulated the lower jaw, composed of two halves (rami) joined at the chin. The skull is articulated to the vertebral column by means of two condyles which fit into the ring-like first cervical vertebra (atlas). The second cervical vertebra (axis) possesses a peg (odontoid process) on which the head and atlas can rotate. The front limbs are invariably present, but in cetaceans and such allied forms as the dugongs and manatees the hinder limbs are either completely suppressed or present only in a rudimentary state. The limbs are generally well developed, and are most commonly adapted for terrestrial progression; some are suited for burrowing, others for climbing, those of the cetaceans and seals for swimming, while some (the bats) have the fore limbs developed into a kind of wing. Teeth are present in most mammals; but they are only represented in the embryo in the whale-bone whales, and are entirely absent in the ant-eater, pangolin, and echidna. The teeth are lodged in *alveoli* or sockets, and are not fused with the jaw-bones as in reptiles and amphibians. Mammals which have only a single set of teeth throughout life are termed *monophyodont*; those which have the first set of teeth (milk or deciduous teeth) replaced by a second set of permanent teeth are called *diphyodont*. The permanent or second set of teeth are

referable to four groups, which differ in form, position, and function: *incisors*, *canines*, *pre-molars*, and *molars*. The chest or thorax is separated from the abdominal cavity by a complete *diaphragm* or 'midriff', which constitutes a great muscular partition with a central tendon between these cavities, and also forms the most important agent in effecting the movements of breathing. Within the thorax the heart and lungs are contained; whilst the abdomen and its lesser pelvic cavity contain the organs relating generally to digestion, excretion, and reproduction. The stomach, generally simple, may, as in some monkeys, in the kangaroos, and most of all in the ruminants, exhibit a division into compartments. A liver and pancreas are present in all Mammalia. The lungs agree in essential structure with those of man, as also does the heart with its four chambers—right and left auricles and right and left ventricles. The red corpuscles of the blood are *non-nucleated*, and are circular in shape except in the case of the camels. All mammals with the exception of the monotremes are viviparous, but there are considerable differences in the relations subsisting between mother and young before birth. (See *Placenta*.) All mammals possess mammary or milk glands, which, however, may differ in number and position throughout the class. (See *Mammary Glands*.) In the classification of this important group the following orders are usually distinguished: Man, Apes, Monkeys, and Lemurs (Primates); the Bats (Chiroptera); the Insect-eaters (Insectivora); the Flesh-eaters (Carnivora); the Whales and Dolphins (Cetacea); the Sea-cows (Sirenia); the Hoofed Mammals (Ungulata); the Gnuwers or Rodents (Rodentia); the Edentates (Edentata); the Marsupials or Pouch-bearing Mammals (Marsupialia); and the Monotremes (Monotremata). — BIBLIOGRAPHY: Flower and Lydekker, *Introduction to the Study of Mammals*; Beddard, *Mammals* (Cambridge Natural History); Aflalo, *Natural History* (Vertebrates) of the British Isles; British Museum, (Natural History); various *Guides* and *Mono-graphs*.

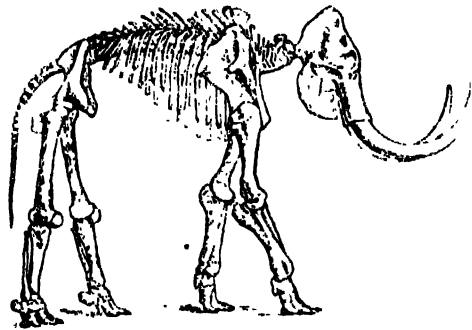
Mammary Glands, the milk-producing organs, the distinctive mark of the mammals. These structures present in man an essentially *lobular* structure. The lobes are divisible into smaller *lobules*, which consist ultimately of groups of vesicles which open into minute ducts converging into larger channels which lead to the milk reservoirs at the nipple. The nipple itself is composed of unstriated muscular fibres and areolar tissue. It also possesses erectile powers, and blood-vessels are in consequence freely distributed to it. These glands, save in exceptional instances, remain in a rudimentary condition in the male. They are always in pairs on some

part of the ventral surface of the body, but in number and position they vary much in the various groups.

Mammee' Tree, or **West India Apricot** (*Mammea americana*), nat. ord. Guttiferae, a tall, handsome tree bearing a fruit about the size of a coco-nut. This has two rinds enclosing the pulp, which is firm, bright-yellow, and has a pleasant taste and smell. The seeds, which are large, are used as anthelmintics, and a gum distilled from the bark is used to destroy chigoes.

Mammon, a Syriac word used in *Matt.* vi, 24, as a personation of riches or worldliness. In *Luke*, xvi, 9-11, it is used literally for riches. There does not appear to have been any idol in the East receiving divine honours under this name.

Mammoth, a species of extinct elephant, the fossil remains of which are found in European, Asiatic, and North American formations. Geologically speaking, the mammoth, or *Elephas*



Skeleton of Mammoth (*Elephas primigenius*)

primigenius, dates from the Post-pliocene period. It survived the glacial epoch, and lived into the earlier portion of the human period, its remains having been frequently found associated with relics of man's activities, and carvings represent it with its curved tusks and its covering of hair. It appears to have been widely distributed over the northern hemisphere, as far south, at any rate, as Spain and Italy, and future discoveries may extend our knowledge of its range. The bones and tusks have been found in great abundance in Siberia, and are exported as ivory. An entire carcass, which had been preserved in the ice and thawed out, was discovered near the end of the eighteenth century on the banks of the River Lena, in such a perfect state that the flesh was eaten by dogs, wolves, and bears. Its skin was perfectly preserved, and was seen to be clothed with a furry wool of reddish colour, interspersed with black hairs. The skeleton and other parts of this animal are preserved in the Petrograd Museum. Similar finds have been made at later

dates in the frozen soils of the Asiatic tundra. The mammoth crossed from England to Ireland at a time when our islands were connected with other European areas by the delta of the Rhine.

Mammoth Cave, an enormous cave in Kentucky, near Green River, about 80 miles s.s.w. of Louisville. It is one of a large series of vast caverns here formed in the limestone rock, and found over a very wide area of Kentucky, Tennessee, and Indiana. It has been penetrated along tortuous passages for many miles, and these ramifying water-ways of ancient times have been for the most part mapped. The walls and floor are mostly dry, and the remains of its stalactite and stalagmite formations are dusty and dilapidated; consequently it is more remarkable for its extent, the size of its halls, and height of its domes, than for the variety or beauty of its scenery. It contains several small lakes or rivers, the largest, Echo River, being more than half a mile long. It rises and falls according as Green River is in flood or otherwise, there being an underground connection between them. The animals of the cave include blind wingless grasshoppers, beetles, rats, &c., and the viviparous blind fish *Amblyopsis*.

Mammoth Tree. See *Sequoia*.

Mamoré, a river of Bolivia, rising in the Cochabamba Mountains as the Rio Grande, and uniting with the Beni at Villa Bella to form the Madeira. The Madeira-Mamoré forest railway was opened for traffic on 15th July, 1912. It runs from São Antonio, on the Madeira River, to Gujara Merim on the Mamoré, and was constructed by Brazil under the terms of the Treaty of Petropolis (1903).

Man, the most highly organized member of the animal world. The endeavour has often been made in classification to separate man from the brute creation. One system, expressing a vast gap between the *Quadrupedia* and man, classifies man in the order *Bimana* ('two-handed'), the highest division of the *Mammalia* class; and relegates the monkeys and apes to the lower and distinct order—that of the *Quadrupedia* ('four-handed'). The more recent arrangements, however, classify man and the monkeys in one order, making man the highest family or group of this order. From the purely anatomical point of view the differences which separate the anthropoid apes from man are in some respects less than those which separate these higher apes from apes lower in the scale. But the mental or psychical endowments of man oblige us to remove him far above the highest *Quadrupedia*; and even the characters by which he is anatomically separated from the highest apes form a very distinct and appreciable series. The first grand characteristic of man is his *erect position* and *bipedal progression*. The lower limbs, with the feet

broad and plantigrade and the well-developed heel, are devoted exclusively to progression and supporting the weight of the body; while the upper limbs have nothing to do with progression, but subserve prehension entirely. The bones of the face in man do not project forwards, whilst they are elongated in a downward direction; and the face and forehead are in the more civilized races situated nearly in the same plane, so that the face immediately underlies the brain. Similarly the development of a distinct chin is also a peculiarly human feature, and one which in the highest varieties of mankind becomes most marked. The great *cranial capacity* of man, or the greater size of the cranial or brain portion as compared with the facial portion of the skull, forms another noteworthy and distinctive character of the human form. The brain convolutions also are more numerous and complex than in the case with any other mammal. The teeth of man are arranged in a continuous series, and without any *diastema* or interval. The development of hair too is very partial. The gorilla presents of all the apes the nearest approach to the human type taken in its entirety; but it differs in the relative number of vertebrae (13 dorsal and 4 lumbar, to 12 and 5 respectively in man), in the order of dental succession and in the presence of the interval or *diastema*, in the less prominent muscular development of the buttocks and calves, and in other minor differences. The orangs most closely approach man's structure in the number of ribs and in the form of the cerebrum, whilst they exhibit the greatest differences from him in the relative length of the limbs. The chimpanzees are most anthropoid in the shape of the cranium, in the arrangement and succession of the teeth, and in the length of the arms as compared with that of the legs. Of the higher apes the gibbons are those furthest removed from the human type of structure. Chief among the psychical features, or rather among the results of the operation of the principle of *mind*, we note the possession of a well-developed *moral sense of right and wrong*. The possession of an articulate language, by which he can communicate his thoughts, is also the exclusive possession of man, and draws a sharp line of separation between him and all other animals. With regard to the geological history of man, the earliest traces yet discovered belong to the Post-pliocene deposits in conjunction with existing species of shells and some extinct species of mammals. Man's advent upon the earth is consequently referred to a period much anterior to that which former limits and theological ideas prescribed. Among the modern theories regarding the origin of man may be noted those of (1) Darwin: that man is directly descended from an extinct form of anthropoid

ape, with a tail and pointed ears, arboreal in its habits and an inhabitant of the Old World; further, that man has diverged into different races or sub-species, but that all the races agree in so many unimportant details of structure, and in so many mental peculiarities, that they can be accounted for only through inheritance from a common progenitor. (2) Wallace also affirms the original unity of man, and places him apart as not only the head and culminating point of the grand series of organic nature, but as, in some degree, a new and distinct order of being; maintaining that a superior intelligence has guided the development of man in a definite direction and for a special purpose, just as man guides the development of many animal and vegetable forms. (3) Carl Vogt holds a plurality of the race; adopts Darwin's idea of natural selection accounting for the origin and endowments of man, but rejects Wallace's idea of the higher controlling intelligence. (4) Mivart propounds a theory of a natural evolution of man as to his body, combined with a supernatural creation as to his soul. See also *Ethnology*; *Anthropology*; *Anthropometry*, &c.

Man, **Isle of**, an island of the Irish Sea; greatest length, 33 miles; maximum breadth, 12 miles; area, 227 sq. miles. The Gulf of Man (800 acres) lies just off the main island, of which it forms a part. A range of hills extends throughout almost the entire length of the island (Snæfells, 2134 feet). Dairy-farming is practised; wheat, oats, and barley or bere are raised, and lead, zinc, clay, gravel, sand, and limestone are produced. The herring fisheries were formerly of considerable importance. Manufactures are comparatively rare. Manx, the native Celtic dialect, akin to Scots and Irish Gaelic, is practically extinct. The chief towns and their approximate populations are: Douglas (capital, 21,200), Ramsey (4250), Peel (2700), and Castletown (2000). The Isle of Man generally, and Douglas in particular, is annually the playground of a vast number of pleasure-seekers, and the entire island is practically laid out to attract visitors. Customs dues are mainly responsible for the revenue, of which £10,000 is contributed annually to the imperial exchequer. There are 25 miles of electric and 46½ miles of steam railway lines converging on Douglas. Pop. about 90,238, varying as the season.

The Isle of Man was known to Cæsar as *Mona*, and, occupied by the Welsh (517), it was taken by the Norsemen (1098), ceded by Magnus II to Alexander III of Scotland (1266), and eventually passed to England (1344). It was held as a feudal sovereignty by the Stanley family, Earls of Derby from 1400 (Henry IV) until 1736, when the direct male line became extinct and Man passed to the Dukes of Atholl, from whom it

was purchased for the British Crown in 1704, and, finally, in 1829 the duke's remaining privileges were ceded by purchase for £417,000. The island is not bound by Acts of the Imperial Parliament unless specially mentioned, and is governed by a Lieutenant-Governor and 'Tynwald', comprising a Legislative Council and the House of Keys (twenty-four members).

Mana'gua. See *Nicaragua*.

Man'akin, the name given to small perching birds forming the family Pipridæ. They are generally of bright plumage, and are mostly confined to South America, a few species being found in Central America and Mexico. The typical genus is *Pipra*, in which the males are brilliantly coloured. The sexes are alike and of sober hue in the related genus *Ptilochlorinus*.

Mana'meh, or **Mena'meh**, commercial capital of the Bahrein Islands in the Persian Gulf, on Bahrein, the chief island; with a trade in pearls, grain, and pulse, cotton goods, coffee, and dates.

Mana'os, a modern city and capital of Amazonas state, Brazil, on the Rio Negro near its confluence with the Amazon, and 1000 miles from the Atlantic. The harbour is modern, and is an important call for ocean-going liners from United States and Europe. The town is a centre of the rubber industry. Pop. 90,000.

Manas'seh, (1) eldest son of Joseph, born in Egypt. His descendants formed a tribe, which, in the Promised Land, was settled half east of the Jordan and half to the west of this river. (2) King of Judah, son of Hezekiah, whom he succeeded at twelve years of age, 697 B.C. He became an open idolater; was taken captive to Babylon; ultimately repented and was restored to his kingdom. He reigned for fifty-five years.

Manatee', the sea-cow or manatin, a gregarious aquatic mammal of the genus *Manatus*, ord. Sirenia, found on the Atlantic coasts of South America and Africa. They generally frequent the mouths of rivers and estuaries, and feed on Algæ and such littoral land vegetation as they can reach at high tide. Their anterior limbs or swimming-paddles are furnished with nails, by means of which they drag themselves along the shore. They are large awkward animals, attaining a length of 8 to 10 feet as a rule, but sometimes growing to 20 feet. The skin is of a greyish colour, sparsely covered with hairs. Their flesh is excellent, and they furnish a soft, clear oil which does not become rancid. There are several species, the principal being the American manatee (*M. americanus*), which inhabits the shallow waters of the east coast of South America, and the African manatee (*M. senegalensis*). The dugong (q.v.) belongs to the same order.

Mancha, La, an ancient province of Spain,

now included mainly in Ciudad Real; the Don Quixote country.

Manche, La, a maritime department of Northern France, with its coast-line on the English Channel (Fr. *La Manche*); part of pre-Revolutionary Normandy. The surface is hilly and well-watered (Rivers Vire, Douve, Selune, &c.); pears, flax, hemp, cereals, and cider apples are grown, and horses are raised. Granite is extensively worked. St. Lô (capital) and Cherbourg are the principal towns. Area, 2473 sq. miles; pop. 425,512.

Manchester, a city and county of a city, municipal, county, and parliamentary borough of Lancashire, 188 miles N.W. of London by railway. The major part of the town stands on a level plain with rising ground on the north side. The dark, viscous waters of the River Irwell divide the city from Salford, a royal borough, which, although it possesses a separate municipal entity, is really part of the same town. The river is spanned by a number of bridges in its progress to join the River Mersey. Transport facilities are essential to a community depending so largely on export trade, and, in addition to its connections with the western group of railways, Manchester has its Ship Canal, making the city a port in touch, through its lines of steamships, with the seaports and trading centres of the world. The old town has Market Street, perhaps the most congested street in Europe, as its centre-line. No attempt was made in old Manchester to follow a regular scheme of street-planning, but every endeavour has been made in modern times to remedy this by opening up through traffic-relieving streets parallel to the main thoroughfares. The centre of the city is entirely occupied by business premises and places of amusement. The factories and workshops are mainly on the eastern side of the town and in Trafford Park, where an industrial area of considerable importance has been developed beside the Ship Canal. The south side is the most favoured residential district, and villadom is extending towards the boundary of Cheshire, in which county there are many residential towns. Manchester has a very cosmopolitan population, with colonies of nationals of every European country, Jews, and Armenians. The town proper has a smoky atmosphere of just such a character as people who wantonly waste their fuel resources deserve. The surroundings of the city are not devoid of rural beauty. There are many public buildings of note. The town hall, an example in the Gothic style of the work of Alfred Waterhouse, was finished in 1877 at a total cost of £1,062,000. The cathedral was built as a parish church in 1422, and was raised to its present status in 1847, when the bishopric was established with James P. Lee as the first

bishop. The Royal Exchange was built in 1869, and greatly enlarged, at a cost of £800,000, in 1921, when it was reopened by King George V. The university buildings, with the Manchester Museum, Whitworth Hall, and Christie Library, are in Oxford Street. The university was founded with £100,000 left by John Owens in 1846. The Municipal College of Technology, in Sackville Street, perhaps the largest and best-equipped institution of its character in the country, is a constituent college of the university. The Rylands Library was gifted to the city, with a permanent income of £13,000, by Mrs. John Rylands as a memorial to her husband. The library contains many historical manuscripts and early editions, including the Althorp Collection purchased from Earl Spencer. The Art Galleries contain a large and representative collection in a building which is totally inadequate in size. Chetham's Hospital was founded by the will of Humphrey Chetham in 1653 for the education of poor boys. There are numerous denominational colleges, many of which are associated in the faculty of divinity of the university. The Free Library, established in 1851, has, since the old building in King Street was sold many years ago, been housed in temporary wooden buildings on the corner of a vacant plot in Piccadilly. There are numerous scientific, literary, musical, and philosophical societies, some of them of considerable standing. There are many public parks, of which the chief are Heaton Park (692 acres), Platt Fields, Whitworth, Alexandra, and Queen's Parks, in some of which there are museums and art galleries. Peel Park, Salford, has an excellent museum and technical institute within its bounds. Among the public monuments, the Albert Memorial in front of the town hall, and that of Queen Victoria in Piccadilly are the most noteworthy. The textile industry centres in Manchester, but there are also chemical-, engineering-, leather-, and rubber-works. Gas- and electricity-supply are municipal enterprises. The water-supply is brought by the corporation from the Longendale Valley and Thirlmere. The electric tramways and the extensive markets of the city are also under the corporation. The history of the town is depicted in a series of frescoes by Ford Madox Brown in the town hall. Manchester is the *Mancunium* of the Romans. Its history is legendary down to the tenth century, when it was devastated by the Danes. In the twelfth century the woollen manufactures began to develop, and in 1301 it received municipal liberties and privileges. During the Civil War the town suffered much at the hands of both parties. The introduction of machinery in cotton-spinning towards the end of the eighteenth century gave power and direction to the trade

of modern Manchester, and its progress since has been extraordinarily rapid. It has played an important part in the political history of the country, especially in connection with the agitation for parliamentary reform and the establishment of free-trade. A temporary check resulted from the Civil War in America, which led to a cotton famine in 1862, causing the deepest distress in South Lancashire. Since 1918 Manchester returns ten members to Parliament, while Salford has three members. Pop. of Manchester, 730,551; of Salford (1921), 234,150. — Cf. G. E. B. Saintsbury, *Manchester: a Concise History*.

Manchester. See *New Hampshire*.

Manchester, The Victoria University of. See *Victoria University*.

Manchester College, a theological institution established in 1786 at Manchester, subsequently removed to York, then back to Manchester, next up to London, and in 1889 to Oxford. Its main object is the teaching of theology apart from the doctrines of any particular sect. It has mainly been supported by Unitarians.

Manchester Party or School, the name given to an English political party whose exertions were particularly directed to the development and carrying out of the principles of free-trade and *laissez-faire*. The immediate object of attack was the Corn Laws, and the Anti-Corn Law League was established in 1839. It had its chief seat in Manchester, and Cobden and Bright were the principal leaders. From its advocating non-intervention in foreign affairs, and arbitration instead of war, it was sometimes called the 'peace-at-any-price' party. See *Free-trade*.

Manchester Ship Canal has a length of 35½ miles, the seaward end being at Eastham on the south side of the Mersey estuary, where three large locks have been constructed. Locks were also made at four other places, namely, Latchford, Irlam, Barton, and Mode Wheel, Manchester being 60 feet above the sea-level. The canal has converted this inland town to the third largest British seaport. The barge canals of England and all the railway systems have connections to the Ship Canal. The average width of the canal at the top is 172 feet, while the minimum depth is 28 feet. There are large docks at Manchester and Salford, of 71 and 38½ acres area respectively. The canal was opened by Queen Victoria in 1894, and altogether cost about £20,000,000, the Manchester corporation being large shareholders, with representation on the board of directors. The opening of the canal has had a large influence on the industrial development of the town, the use of Trafford Park as an industrial estate with over one hundred works, some giving employment to

thousands of men, being a natural consequence. The tonnage and revenue have shown continuous increases since the opening date. The revenue, which was £94,656 in 1894, £201,784 in 1900, £555,735 in 1910, reached £2,448,848 (gross value, including revenue from railways and the Bridgewater (canal) in 1920, of which £1,461,909 is the value of the traffic receipts. It is interesting to note that the first navigable aqueduct, that at Barton, constructed by James Brindley, had to be converted to the first swing aqueduct by Sir E. Leader Williams, the engineer who designed the Ship Canal. — Cf. Sir Bosdin Leech, *History of the Manchester Ship Canal*.

Manchuria, a Chinese territory occupying the north-east corner of the republic and abutting on Siberia and Korea. It is divided into three provinces: Sheng-king (Feng-tien), Kirin, and Heilung-Chiang (Amur Province); total area, about 364,000 sq. miles. The Manchus formerly had their home in Manchuria, but of late years their country has been a colonial settlement for vast numbers of immigrant Chinese, and the indigenous population has suffered as a consequence. Manchuria lies around the Sungari basin, and is one of the richest agricultural districts of Eastern Asia. The principal food-crops are millet, wheat, and rice; about 5,000,000 acres are cultivated for soya bean; minerals are abundant. The Trans-Siberian Railway runs to Harbin, where it forks for Vladivostok and Mukden. At Mukden branches diverge to the Chinese Government, Korean, and Port Arthur lines.

From 1644 until 1912 the Manchu dynasty reigned over China, and the Manchu language was official for both court and state. In 1900, following upon the Boxer outbreak, Russia occupied Manchuria. By the Manchurian Convention (1902) she was expected to evacuate the occupied territory, but failed to do so, and war ensued between Russia and Japan (Feb., 1904), which resulted in the restoration of Manchuria to China. Pop. of the territory, probably 20,000,000, but variously estimated at from 5 to 30 million. — Cf. A. Hosie, *Manchuria: its People, Resources, and Recent History*.

Mandæans, Nasoræans, Sabians, or St. John's Christians, a religious sect which existed in Babylonia and Mesopotamia from the beginning of the Christian era. Known as Sabians (from *sabba*, to baptize), and as *Mandaye* (gnostikoi), they are the only gnostic sect whose sacred writings are still extant. Their religion is a form of gnosticism with elements of Judaism, and Hindu and Parsee philosophy. About forty years ago (in 1880) the number of Mandæans was estimated at about 4000, but at present the followers of the Mandæan faith are but few, and may be found in some cities on the Lower Euphrates and the Lower Tigris, near Basra

and in Khuzistan.—**BIBLIOGRAPHY:** W. Brandt, *Die mandäische Religion*; and article in Hastings' *Encyclopædia of Ethics and Religion*.

Mandalay, a city and capital of Upper Burmah; a river-port on the Irawadi, 400 miles north of Rangoon. From 1857 Mandalay was capital of Burmah, but in 1885 King Theebaw was deposed by the British and his dominions annexed to Burmah. In 1892 the old city was partly destroyed by fire; a new one was built, and the ancient, square-built, walled, and towered city is now known as Fort Dufferin. Theebaw's palace and the pagodas of the Temple of Kuthodaw are unique. Pop. 138,000.

Manda'mus, in law, a command or writ issuing from a superior court, directed to any person, corporation, or inferior court, requiring them to do some act therein specified which appertains to their office and duty, as to admit a person to an office or franchise, or to deliver papers, &c.

Mandarin Duck, a beautiful species of duck (*Aix galericulata*) from Eastern Asia, the males of which exhibit a highly variegated plumage of green, purple, white, and chestnut, the females being coloured a more sober brown. The male loses his fine plumage in summer.

Mandate, in law, is "that contract by which a person employs his friend to manage his affairs, or any branch of them". The party granting the mandate is termed the 'mandant'; the party undertaking to carry it out, the 'mandatary'. A mandate may be express or implied; general or special. An example of an implied mandate is the authority which a wife has to pledge her husband's credit for necessities for the household. A special mandate covers only a particular act and falls when that act has been performed. The mandatary must carry out the mandate with the care which he would exercise in his own affairs, and generally he cannot delegate his authority. He must account to the mandant for his intromissions, and the latter is bound to reimburse any expenses which he has properly incurred. A mandate may be renounced by the mandatary or revoked by the mandant; terminated by the death, bankruptcy, or insanity of either party; or exhausted by fulfilment of the purpose for which it was granted.

A recent application of the term is to the authority granted by the League of Nations to the various Allied Powers under the Treaty of Versailles to administer territories captured from Germany and Turkey.

Man'deville, Bernard de, poet and philosophical writer, born in Holland about 1070, died in 1133. His most celebrated production is *The Fable of the Bees, or Private Vices Public Benefits*, the first part of which appeared in 1723, and the

second in 1728. It created quite a sensation, and called forth replies from Bishop Berkeley, William Law, and others. Among his other works are: *Free Thoughts on Religion* (1720) and *Origin of Honour* (1732).

Mandeville, Sir John de, the name assumed by the author of a famous book of travels, *The Voiage and Travaile of Sir John Maundeville, knight*, which was originally written in French between 1357 and 1371. This was one of the most popular books of the Middle Ages; it was translated into eleven languages, and over 300 manuscripts of it are still extant. The *Travels* is perhaps the most wonderful literary forgery in the world. Mandeville was acclaimed as 'the Father of English Prose', when 'the Father of Lies' would have been a more appropriate title. The book enjoyed a world-wide fame for five centuries before it was discovered that Sir John never lived, and that the author of the *Travels* never travelled, but sat in his well-stocked library and drew his material from innumerable sources, some as old as Pliny if not as old as Homer. According to the *Travels*, Mandeville was born at St. Albans about 1300, started on his travels in 1322, returned in 1357 owing to an attack of arthritic gout, and settled at Liège, where he wrote his book to pass the time during attacks of his malady, and where he eventually died and was buried. The real author of the book is not known with complete certainty, but strong cumulative evidence points to one Jean d'Outremeuse, a voluminous writer who lived at Liège, the supposed site of Sir John's death and burial. The authors from whom 'Mandeville' borrowed most are Albert of Aix, who wrote an account of the first Crusade, William of Boldensele, and, above all, the travels of a Franciscan missionary, Friar Odoric of Pordenone (1330). *Mandeville's Travels* is quite one of the most delightful of the books of the Middle Ages; it was one of the earliest books to be written with no other aim than that of entertainment. Many well-known stories and legends owe their origin to 'Mandeville'. Prester John and the Great Cham, the Earthly Paradise, the loadstone mountains, the fountain of youth—these and such like are the subjects of his marvellous tales. The English translation, charming in its naïveté, is one of the best specimens of prose of its time.

Manding'oes. See *Bambro*; *Barra*.

Man'doline (It. *mandolina*, dim. of *mandola*), a musical instrument of the guitar kind. There are several varieties, each with different tunings. The Neapolitan has four strings tuned like those of the violin, G, D, A, E; the Milanese has five double strings (each pair in unison) tuned G, C, A, D, E. A plectrum is used in the right hand, the fingers of the left stopping the strings on the fretted finger-board.

Mandrake, the popular name of plants of the genus *Mandragora*, nat. ord. Solanaceæ, natives of south and east of Europe and Western Asia, and not uncommon in British gardens. *M. officinarum* has large tap-roots; the leaves radical, sessile, ovate, entire, and waved. There is no stem; but the flowers, which are white with a bell-shaped corolla, stand upon simple stalks. The fruit is a large two-celled berry of an orange colour, containing many kidney-shaped seeds. The root possesses narcotic qualities, and from its occasional resemblance to the human figure was formerly supposed to possess an inferior kind of animal life, and to shriek when torn up. It was believed to have many magical virtues, and to be an aphrodisiac and a cure for barrenness (*Gen.* xxx, 14, 16).

Mandrill, a species of baboon (*Cynocephalus mormon*), which is distinguished by the short tail, by the elongated dog-like muzzle, and by the presence of buttock callosities which



Mandrill (*Cynocephalus mormon*)

are generally brightly coloured. Mandrills are natives of Western Africa, where they associate in large troops. Full-grown males measure about 5 feet; they are exceedingly strong and muscular, and fierce in disposition. They have cheek protuberances coloured with stripes of brilliant red and blue.

Man'es, among the Romans, the souls or ghosts of the dead, to whom were presented oblations of victims, wine, milk, garlands of flowers, &c. The offerings were made at funerals, and at the *Parentalia*, or *Feralia*, commemorative ceremonies held by the Romans in February. A similar worship of ghosts or ancestral spirits prevails among many races.—*Cf.* W. W. Fowler, *Roman Festivals*.

Man'etho, an Egyptian priest and historian, who belonged to the town of Sebennytus, in

Lower Egypt, and lived in the reign of Ptolemy Soter, about the beginning of the third century B.C. His history was divided into three books, and beginning with the fabulous or mythological history of Egypt, ended with the 30th dynasty, when Egypt fell under the rule of Alexander the Great. The history itself is lost, but the lists of the dynasties are preserved in Julius Africanus and Eusebius, and in the work of George Syncellus of Byzantium (A.D. 792), and some fragments of the work are to be found in Josephus (*Against Apion*).

Manfredonia, a seaport of Foggia, Italy, on the Gulf of Manfredonia, an arm of the Adriatic. The town lies south of Monte Gargano (3440 feet). The fisheries occupy the inhabitants; figs and almonds are exported. Manfredonia was founded by King Manfred (1231–66) about 1263, was destroyed by the Turks (1620), and subsequently rebuilt. Two miles west of the town is the cathedral of S. Maria di Siponto, forming part of the remains of Roman *Sipontum*, founded 194 B.C. Pop. about 14,000.

Mangalore, a seaport and head-quarters of the South Kanara district, Madras, India, on an open roadstead suitable for small craft. There is a Jesuit college affiliated with the University of Madras, and a Jesuit mission (founded 1880). Coffee, tiles, salted fish, and spices are the principal exports. The town was taken by Tippoo Sultan (Sahib) after a siege lasting from 19th May, 1783, to 23rd Jan., 1784. It became British in 1799. Pop. 48,000.

Man'gane'se (symbol, Mn; atomic weight, 54.93), a metal of a reddish-white colour; it has a high metallic lustre, is harder than iron, and melts at 1200° C. It does not readily tarnish, does not decompose water, but reacts readily with most dilute acids. The common ore is the dioxide, black oxide, or peroxide (MnO_2), the pyrolusite of mineralogists, a substance largely employed in the preparation of chlorine for the manufacture of bleaching-powder or chloride of lime. It is employed in the manufacture of plate-glass, to correct the yellow colour which oxide of iron is apt to impart to the glass. It is also used in making the black enamel of pottery. Other oxides are the protoxide (MnO), sesquioxide (Mn_2O_3), the red oxide (Mn_2O_4), and permanganic anhydride (Mn_2O_7). From the last is derived the well-known compound potassium permanganate ($K_2Mn_2O_8$). Metallic manganese is obtained by reduction of the oxide by means of aluminium powder. It resembles iron in appearance and properties; its salts are contained in many mineral waters, and are employed in medicine. In steel manufacture it is used in certain proportions with advantage as regards the ductility of the steel and ability to withstand forging, and in other manufacturing operations

it forms an important element. It is added to steel in the form of spiegeleisen, an alloy of iron containing about 20 per cent of manganese made in blast-furnaces, or as ferro-manganese, an alloy containing about 80 per cent made in blast- or electric-furnaces.

Manganese Bronze, copper-zinc alloys which contain a small quantity of manganese, and which have exceptional qualities in the way of strength, hardness, toughness, &c. Various qualities are manufactured, each suited for certain special purposes. The usual alloys contain copper, 58 to 60; zinc, 39 to 41; manganese, traces to 2 per cent, and often about 1 per cent of tin, iron, and aluminium. The manganese is added to the copper-zinc alloy in the form of cupro-manganese or as ferro-manganese. The alloys are strong, and remain strong at high temperatures, and are suitable for steam-valves, &c. They resist the action of sea-water, and are used for propellers, rudders, &c.

Manganite, a black prismatic mineral, one of the ores of manganese, $MnO(OH)$, that is, $Mn_2O_3 \cdot H_2O$. It is also called *Grey Manganese-ore*, and is used as a decolorizer in the manufacture of glass.

Mange, a parasitic skin disease affecting horses, cattle, and dogs; known as *scab* in the case of sheep. Two mites cause body-mange (sarcoptic and psoroptic), which are contagious and notifiable diseases; choriopic, symbiotic or leg mange chiefly affects horses, and is not notifiable. Treatment is difficult, but a preliminary scrubbing with hot water, soap, and soda removes dirt and scales, and prepares for washing in a solution of coal-tar disinfectant. (second day). Sulphur, 1 part, and train-oil 6 parts, should be applied on the third day. Disinfection and isolation are essential.

Mangel-wurzel (Mangold), a large-rooted species of beet (*Beta vulgaris macrorrhiza*) extensively cultivated in Britain and on the Continent for feeding cattle. It requires a sunny climate and liberally manured generous soil, which in favourable circumstances may grow from 70 to 80 tons per acre.

Mango, the fruit of the mango tree (*Mangifera indica*), nat. ord. Anacardiaceæ, a native of tropical Asia, but now widely cultivated throughout the tropics. Fine varieties produce a luscious, slightly acid, and resinous fruit much prized for dessert. The large flat kernel of the fruit is nutritious, and has been cooked for food in times of scarcity. The fruit forms a fleshy drupe about the size of a hen's egg or larger, somewhat kidney-shaped and yellowish or reddish in colour, spotted with black on the outside. The fruit is much used for making pickles, chutneys, and curries. Dried, it forms a con-

siderable article of commerce. It yields by distillation a spirit said to be not unlike whisky in flavour. The tree grows to a considerable size, with an erect trunk, and yields



Mango (*Mangifera indica*)

a timber that is used for purposes for which fine timber is not required, as for packing-boxes, country carts, rough furniture, and house carpentry.

Mangosteen, a tree of the East Indies, *Garcinia Mangostana*, nat. ord. Guttiferae. The tree grows to the height of 18 feet, and the fruit is about the size of an orange, and contains a juicy white pulp of a delicate, sweet, sub-acid flavour. It is esteemed one of the most delicious and wholesome of all known fruits. The thick fleshy rind has astringent properties, and hence is used medicinally in diarrhoea and dysentery.

Mangrove (Rhizophora), a genus of plants (type of the family Rhizophoraceæ) consisting of trees or shrubs which grow in tropical countries along the muddy benches of low coasts, where they form impenetrable barriers for long distances. They throw out numerous roots from the lower part of the stem, and also send down long slender roots from the branches, like the Indian banyan tree. The seeds germinate in the seed-vessel, the young seedling ultimately falling root foremost and thus planting itself in the mud. By retaining mud and vegetable matter among their roots, mangroves often help in the gaining of land from the sea. The wood of *R. Mangle* is dark-red, hard, and durable, and the bark is used for tanning. The fruit is said to be sweet and edible, and the fermented juice is made into a kind of light wine. The name is also given to the genus *Avicennia* of

the verberna family, which occupies large tracts of shore in tropical countries, extending as far south as New Zealand and Tasmania.



Mangroves

Manhattan Island. See *New York*.

Manicheans (man-i-kē'anz), or **Manichees**, an Oriental religious sect founded by Manichæus, Manes, or Mani, a Persian of the third century after Christ, educated in the religion of Zoroaster. His object was to incorporate Zoroastrian dualism with Christianity. (See *Zoroaster*.) In the fervour of his fanaticism he gave himself out to be the Paraclete promised in the *Gospel of John*, by which he understood, not the Holy Ghost, as many had erroneously imagined, but a teacher commissioned to diffuse and perfect Christianity, and free it from the vile corruptions of the evil genius Ahriman (q.v.). Manes appeared as a religious teacher under Sapor I. As a man of multifarious accomplishment he attracted great attention; but the hostility of the magi forced him to a speedy exile. He wandered into distant countries, still pursuing his mission, and in the East his contact with Buddhism gave new shape and tinge to his eclectic views. On his return to Persia Hormisdas received him with welcome; but under his successor Varanes, Manes was apprehended and flayed alive, while his skin was stuffed and hung up in public. His system spread over various portions of the Christian Church, and Augustine was for a season fascinated by its speculations.

Manila, a city, chief seaport, and capital of the Philippines, on the south-west coast of Luzon and on Manila Bay, an arm of the China Sea, forming the finest harbour in the Far East. The city is divided into a northern and a southern

half by the River Pasig, at the mouth of which it stands, the southern being enclosed by a sixteenth-century wall, and the northern forming the modern suburbs. There is a cathedral, and a university (S. Thomas) founded by the Dominicans and Jesuits through an authorization granted by Philip II of Spain in 1585. The modern university dates from 1857, and is conducted on American lines, with faculties of medicine, pharmacy, engineering, law, philosophy, and arts. A mint is established in Manila, where the Philippine coinage is produced. Cigars, cigarettes, tobacco, and Manila hemp, ships and boats, and textiles are manufactured, and copra, sugar, tobacco, and hemp are exported.

Manila was founded by Spain (1571), was in British occupation (1702-4), and was annexed by the United States during the Spanish-American War (1898), when Admiral Dewey destroyed the Spanish fleet under Montijo in Manila Bay (1st May, 1898). Pop. (1918), 283,613 (of which 257,356 were Filipinos, 17,856 Chinese, 1611 Japanese, 3124 Americans, 1955 Spaniards, 635 British, 160 French, and 95 Swiss).

Man'ple, in the Roman Catholic and some other Churches, one of the sacred vestments, being an ornament worn by the priest above the left wrist at the celebration of the eucharist. It is now of the same width and colour as the stole and the vestment or chasuble, fringed at the ends, and generally about 1½ yards in length.

Manipur (-pór'), a native state of North-Eastern India, in Assam. Area, 8000 sq. miles; pop. 346,000; capital, Imphal.

Manitoba, the most westerly of the three prairie-provinces of Canada; area, 251,832 sq. miles (19,006 sq. miles are water). It is an extensive plain traversed by the Nelson, Assiniboine, Hayes, and Red Rivers, and containing Lakes Winnipeg (8500 sq. miles), Winnipegosis (1936 sq. miles), and Manitoba (1820 sq. miles). Among towns are Winnipeg (the capital), Brandon, Pas, Churchill, and Port Nelson. Manitoba is essentially agricultural, producing wheat (Manitoba 'No. 1 Hard' is the world's standard), oats, barley, flax, rye, and potatoes. Live-stock and dairy-farming are popular (dairy products value 16,800,000 dollars in 1919); fishing and lumbering are carried on, and vast deposits of gold and copper have been found. Winnipeg is the focus of all the Canadian Trans-continental Railway systems, and the Province is traversed by 4463 miles of track (1920). The capital also contains the Provincial Agricultural College and Manitoba University.

The nucleus of Manitoba was the Red River Settlement, founded by Lord Selkirk in 1812, and annexed to the dominion in 1870. In 1912 the provincial boundaries were extended to

Hudson Bay at the expense of Keewatin. A Lieutenant-Governor is assisted in local government by a Legislative Assembly of fifty-five members, elected every five years. The province sends six members to the Senate and fifteen to the Commons of the Dominion Parliament (Ottawa). Pop. (estimated 1920), 620,000, mixed, but mainly of British descent.—Cf. H. T. Boom and A. G. Brown, *The Prairie Provinces of Canada*.

Manizales, a city of Colombia, South America, capital of the department of Caldas (lat. $5^{\circ} 5' N.$, long. $75^{\circ} 36' W.$; altitude, 7000 feet. It is a trading centre exporting gold, coffee, and cocoa. Pop. (1918), 39,643. Caldas has an area of 7380 sq. miles, and a pop. (1918) of 428,137.

Manna, the sweet concrete juice which is obtained by incisions made in the stem of a species of ash, *Fraxinus Ornus*, a native of Sicily, Calabria, and other parts of the south of Europe. The manna of commerce is collected in Sicily, where the manna-ash is cultivated for the purpose in regular plantations. The best manna is in oblong pieces or flakes of a whitish or pale-yellow colour, light, friable, and somewhat transparent. It has a slight peculiar odour, and a sweetish taste mixed with a slight degree of bitterness, and is employed as a gentle laxative. Other sweetish secretions exuded by some other plants growing in warm and dry climates, as the *Eucalyptus mannifera* of Australia, the *Tamarix mannifera* or *gallica* of Arabia and Syria, are considered to be kinds of manna. Small quantities of manna, known under the name of *Brianon manna*, are obtained from the common larch. In Scripture we are told that a substance called manna was miraculously furnished as food to the Israelites in their journey through the wilderness of Arabia. Some identify it with the saccharine substance yielded by the *Tamarix mannifera*.

Mannheim (see him), a town and river-port of Baden, on the Rhine. It is surrounded by a promenade on the site of the ancient ramparts, and is connected by a bridge with Ludwigshafen (Bavaria) on the opposite bank of the Rhine. It has extensive harbours, and is the chief commercial town on the Upper Rhine. Machinery, sugar, chemicals, and tobacco are manufactured. The palace was built by the Elector Palatine Charles Philip, 1720-9. Mannheim was founded in 1606 by the Elector Palatine Frederick IV, was destroyed in the Thirty Years' War, and passed from Bavaria to Baden in 1802. Pop. (1919), 229,576.

Manning, Henry Edward, Cardinal, born at Totteridge, Hertfordshire, 1808, died 1892. He was educated at Harrow and Balliol College, Oxford; rector of Lavington and Graffham, Sussex (1834-40); Archdeacon of Chichester

(1840-51). He took an active part in the Tractarian movement, and in 1851 joined the Church of Rome and was ordained priest. On the death of Cardinal Wiseman he succeeded him as Archbishop of Westminster (1863), and ten years after he was made cardinal. Social and philanthropic questions received much of his attention; he was an ardent supporter of total abstinence, and he was a member of commissions on the housing of the poor and on education. Besides sermons, he wrote: *The Temporal Power of the Pope, The True Story of the Vatican Council*, and *The Four Great Evils of the Day*.—Cf. S. Leslie, *Henry Edward Manning: his Life and Labours*.

Mannite, or **Mannitol** ($C_6H_{12}O_6$), a hexahydric alcohol closely related to the sugars. It occurs in many plants and in some fermented juices, e.g. beet-root juice. It may be obtained from manna by extracting with alcohol, from which it crystallizes in colourless needles of melting-point $166^{\circ} C.$ It is readily soluble in cold water, insoluble in ether, has a sweet taste, and on oxidation yields the sugar mannose, $C_6H_{12}O_6$.

Manœuvres, a series of exercises performed by fleets or large bodies of troops of all arms as a means of providing combined tactical training for war. In war, however, no restrictions exist as to the use of ground other than those which can be imposed by enemy agency, while, under manœuvrè conditions, rules and restrictions as to where troops may pass or may not pass are endless and vexatious. As a rule, all private property is 'out of bounds', and is so marked on the manœuvrè maps, causing much confusion to troops operating in that particular neighbourhood, and adding considerably to the difficulties of the directing staff.

Of course the chief dissimilarity between manœuvres and war, and the one which above all tends to make such operations unreal, is the absence of bullets. The British soldier—incomparable in war—does not take kindly to the make-believe variety, and, from his point of view, it must be admitted that it would require a very highly developed sense of duty to cause Mr. Atkins—or for the matter of that a junior regimental officer—to carry out movements and actions required of him in the same manner and with the same expenditure of physical energy he would use in war, knowing full well that failure to do so would in no case cause him any actual physical hurt or injury. But when we come to consider the staff—both general and administrative—the position is quite different. The staff is concerned either with the moving of the troops, as one moves pieces on the chess-board, or with their supply and administration before, during, and after movement, and the

absence of bullets and other missiles in the enemy's guns and rifles does not so much affect the questions to be dealt with. It is therefore open to question whether, from the point of view of actual tactical training, manoeuvres are not of more value to staff and senior regimental officers than to junior officers and rank and file. These last two categories do no doubt gain some experience in the A B C of active service conditions, and as far as it goes this is of value.

It is probable that when manoeuvres on a scale such as was planned for the autumn of 1914 again take place in England, many of the methods developed during the European War will be simulated; this will tend towards realism, and will make the operations more interesting to the rank and file of the army, and incidentally may help to solve the difficulties of the directing and umpire staff in dealing with prohibited areas. Umpires are a necessary evil on manoeuvres; they are presumed to represent the controlling influence that in war would be the province of the bullets and shells of the enemy, and, in order to permit of this being done, they are vested with authority to control movements of troops in actual contact; occasionally, also, they serve to give away the position to be attacked by appearing on the sky-line.

Manom'eter, an instrument used to measure fluid pressures. In its simplest form it consists of a simple U-tube in which the pressure is balanced by a column of water or mercury acting with or against the atmospheric pressure. A tube similar but with a closed arm is another form, the compression of the enclosed air being used to obtain the pressure. A barometer is also a type of manometer.

Man'or (Fr. *manoir*; Lat. *manerium*, a dwelling-place, from *manere*, to dwell), originally a piece of territory held by a lord or great personage, who occupied a part of it, as much as was necessary for the use of his own immediate family, and granted or leased the remainder to tenants for stipulated rents or services. Manors were also called baronies, as they still are lordships, and the lord was empowered to hold a domestic court called the *court baron* for punishing misdemeanours, settling disputes, &c., within

the manor. No manors, with all their incidents and franchises, have been granted in England since the reign of Edward III.

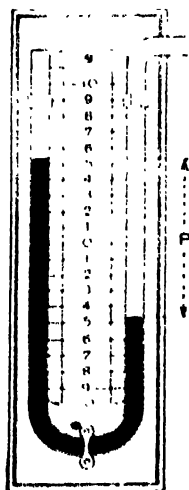
Manre'sa, an ancient city of Barcelona, Spain; the Roman *Munoris*, capital of the *Jacetani*; on the Cardener, which is spanned by a Roman bridge. The city is 40 miles N.N.W. of Barcelona by rail, and is a railway junction. Cotton, woollens, and paper are manufactured. There is a Dominican convent, and a church associated with Loyola. Pop. 24,000.

Mansard, or Mansart (mān-sār), François, French architect, born in Paris 1598, died there 1666. Among his principal works are part of the château of Blois, and the château of Maisons. Based on the study of classical antiquity, his buildings show a characteristic dignity, elegance, and logic in construction. His nephew, Jules Hardouin, who assumed his name (1645-1708), was less great as an artist, but achieved much worldly success. The Palais de Versailles, the Hôtel des Invalides and the Place Vendôme in Paris, and other works of the reign of Louis XIV. are from his designs.

Manse, in Scotland, the dwelling-house of a parish minister of a rural parish. Every minister of a rural parish (*quoad omnia*) is entitled to have a manse erected and upheld by the heritors, but the ministers of royal burghs have properly no such right, unless where there is a landward district belonging to the parish in which the burgh lies. The term is sometimes loosely applied to the dwelling-house of dissenting ministers.

Mansel, Henry Longueville, a logician and theologian, born at Cosgrove, Northamptonshire, 1820, died in London 1871. He became professor of moral and metaphysical philosophy at Oxford in 1859; professor of ecclesiastical history 1867; and Dean of St. Paul's, London, 1868. He was the chief exponent of the philosophy of Sir William Hamilton, and collaborated with Professor Veitch in editing Hamilton's Lectures. Among his publications are: *The Philosophy of Kant* (1856); *The Limits of Religious Thought, being the Bampton Lectures for 1858*; and *Metaphysics, or the Philosophy of Consciousness* (1860).—Cf. A. W. Benn, *History of Rationalism*.

Mansfield, William Murray, Earl of, the fourth son of David, Lord Stormont, was born at Seone, in Scotland, 2nd March, 1705, died 20th March, 1793. Educated at Westminster School and at Oxford, he entered Lincoln's Inn and was called to the Bar in 1731. In 1742 he was appointed Solicitor-General, and obtained a seat in Parliament about the same time. In 1754 he was Attorney-General, and in 1756 he was appointed Chief Justice of the King's Bench, and made Baron



Manometer
P, Pressure above atmosphere as column of water.

Mansfield. In 1770 he was advanced to the dignity of earl. On the trial of Woodfall for publishing *The Letters of Junius*, and on some other occasions, he showed himself the zealous supporter of the Government, and gave offence to the popular party. During the riots of 1780 his house in London was burned down by the mob. In 1788 he resigned his office of Chief Justice, and the remainder of his life was spent in retirement. He was a great lawyer, not merely in a technical sense, but as one who could direct the practice of the courts towards broad principles of jurisprudence. Many departments in the mercantile law of England and Scotland were created by him, and among others the law of marine insurance was made and systematized by his decisions.

Mansfield, a town of Nottinghamshire, England, on the Maun, served by the Great Central and Midland Railways. There are collieries in the vicinity. Thread, hosiery, lace, and boots are manufactured. The Courts for Sherwood Forest were held at Mansfield till 1715. Pop. (1921), 44,418.

Mansfield College, a theological college established at Oxford for the education of men for the Nonconformist ministry, and opened in 1880. The college is not incorporated with the university. Its students must be graduates of some recognized university, or undergraduates of Oxford who have passed Moderations.

Mansion House, the nomenclature applied to the official residence of the Lord Mayor of London, and frequently used in describing other mayoral residences, e.g. at Dublin. The London building is located at the far end of Poultry. It was erected by George Dance between Oct., 1739, and 1753. The principal room is the Egyptian Hall, where banquets and balls are given, and which is a reproduction of the Egyptian Hall described by Vitruvius. The City police-court is held in the basement.

Manslaughter is the crime of unlawfully killing a human being without malice aforethought. It is essential that there should be want of premeditation to kill. Unlawful premeditated killing is the graver crime of murder (q.v.). There may, however, be premeditation in the eyes of the law though there was no real intent to kill, e.g. when death is caused by anyone while committing a felony, or when an act is done in the knowledge that death will probably ensue and it does. Manslaughter may vary from cases in which negligence alone is the cause of death, as when one, driving negligently, runs down and kills another, to cases nearly approaching murder, as when one kills another in sudden passion under great provocation. Manslaughter is punishable by penal

servitude, imprisonment, or fine, according to the degree of culpability. See *Homicide*.

Mans, *Le* (lə mān), a town and capital of Sarthe, France; the Roman *Cenomanis*; on the Sarthe. The cathedral of St. Julien (partly eleventh and twelfth centuries) and the church of Notre Dame de la Couture (twelfth to fourteenth centuries) are historically interesting. Le Mans was the birth-place of Henry II, first Plantagenet king of England; it witnessed the final dispersion of the Vendean insurgents by Mareau (1793), and the defeat of the French army under Chanzy by the Germans under Prince Frederick Charles, Jan., 1871. Pop. about 80,500.

Mansûra, a city of Lower Egypt, at the junction of the Nile (Damietta branch) and a canal running to Lake Menzala. It is a commercial centre in the Delta cotton district. Mansûra was founded in 1222, and was attacked by the Crusaders under Louis IX in 1250. Louis was captured and his army defeated. Pop. (1917), 40,238.

Mantegna (mān-ten'yā), Andrea, early Italian painter, born at Padua 1431, died at Mantua 1506. About 1459 he went to Verona, where he painted a magnificent altar-piece in the church of St. Zeno. About 1466 he removed to Mantua, and the rest of his life was passed there, with the exception of two years at Rome. At Mantua he opened a school, and painted among other important works the *Triumph of Julius Cæsar*, now at Hampton Court. One of the latest and best of this artist's works is the *Madonna della Vittoria*, now in the Louvre at Paris. There are others of his works in the Louvre, in particular *Wisdom vanquishing Vice*, and a mythological work, *Parnassus*. Mantegna excelled in perspective, which was then a rare merit; he also excelled in engraving, and introduced the art of engraving on copper into Upper Italy.

Mantine'a (Gr. *Mantinea*), a city of Arcadia, ancient Greece, the scene of the victory and death of Epaminondas (Theban victory over the Spartans, 362 B.C.).

Mantis, a genus of orthopterous insects. They frequent various plants, and the forms and colours of their bodies and wings are so like the leaves, twigs, and flowers which surround them as to make them very inconspicuous. (See *Mimicry*.) The *M. religiosa*, or praying-mantis, has received its name from the peculiar position of the anterior pair of legs, resembling that of a person's hands at prayer. In their habits they are very voracious, killing insects and cutting them to pieces. They are natives chiefly of tropical regions, but are also found in France, Spain, and the warmer parts of Europe. They are very pugnacious, and are kept by the

Chinese for the purpose of watching them fight.

Man'tua (It. *Mantova*), a province of Lombardy, Italy, traversed by the Po, Mincio, and Oglio. It is low-lying, level, and produces rice, silk, vines, and cereals. Area, 903 sq. miles; pop. (estimated), 300,500. — *Mantua*, the provincial capital, is a fortress city on the Mincio; with Legagno, Verona, and Peschiera it formed the Austrian *Quadrilateral*. The church of S. Andrea, begun 1472, was designed by Alberti, and contains the tomb of Mantegna. The twelfth-century cathedral (S. Pietro) and the ducal palace of the Gonzagus (1302) are historical. Founded by the Etruscans, Mantua (*Andes* or *Pietole* near by) was the birth-place of Virgil. From 1328 to 1708 the House of Gonzaga (q.v.) held sovereign power over Mantua, first as captains, or marquesses, and afterwards as dukes. Stormed and sacked by the Austrians (1630), Mantua was forfeited to the Empire (1703). It suffered during the Napoleonic campaigns, and was ceded to Italy in 1806. Pop. (estimated), 34,500.

Manures. See *Soils and Manures*.

Manuscripts (Lat. *manu scriptus*, written by the hand) are writings of any kind, whether on paper or other material, in distinction to printed matter and inscriptions. Previous to the introduction of printing all literature was contained in manuscripts, and the deciphering and proper use of these form an important part in the science of paleography. All the existing ancient manuscripts are written on parchment, vellum, leather, papyrus, or paper. The most common ink is the black, which is very old. Red ink of dazzling beauty is also found in ancient manuscripts. With it were written the initial letters, the first lines, and the titles, which were thence called *rubrics* (Lat. *ruber*, red). Blue, green, and yellow inks were more rarely used. On rare occasions gold and silver inks were used, though from their cost they are oftenest confined to initial letters. With respect to external form, manuscripts are divided into rolls (*volumina*), and into stitched books or volumes (*codices*). Among the ancients the writers of manuscripts were mainly freedmen or slaves. At a later period the monks were largely engaged in the production of manuscripts. In all the principal monasteries was a *scriptorium*, in which the scribe or scribe could pursue his work in quiet, generally assisted by a *dictator*, who read aloud the text to be copied; the manuscript was then revised by a *corrector*, and afterwards handed to the *miniator*, who added the ornamental capitals and artistic designs. The most ancient manuscripts still preserved are those written on papyrus, and found in Egyptian tombs. A number of these are of date long before the Christian era, and one in Egyptian writing

dates from perhaps 2500 B.C. Valuable MSS. of Greek writings have been found in Egypt, some of them containing works supposed to have been entirely lost. They go back to about 800 B.C. Next to them in point of age are the Latin manuscripts found at Herculaneum. Among manuscripts of the imperial era of Rome are the *Vatican Terence* and *Septuagint* (fourth century), and the *Codex Alexandrinus* of the British Museum. Few Biblical manuscripts are as old as the third century, one of the most famous being the *Codex Sinaiticus*, discovered in a Sinai convent and belonging to the fourth century. Among those of Latin authors may be noted that of Virgil (fourth century), in the Laurentian Library at Florence, and a Livy (fifth century) in the Imperial Library of Vienna. The characters used in the older manuscripts were generally of large size, often what we should call capital letters, these and other large letters being called *majuscles* and *uncials*, as contrasted with *minuscules* or small letters. It was common in the Middle Ages to erase writings on parchment, and to re-use the material, manuscripts so treated being called *palimpsests*.

The art of illuminating manuscripts dates from the remotest antiquity. The Egyptian papyrus were ornamented with vignettes or miniatures attached to the chapters, either designed in black outlines or painted in primary colours in distemper. The oldest ornamented Greek and Roman manuscripts that have survived are the Dioscorides of Vienna and the Virgil of the Vatican, both of the fourth century, and having vignettes or pictures in a Byzantine style of art. From the eighth to the eleventh century the initial letters in use were composed of figures of men, quadrupeds, fishes, birds, &c. The initials of the twelfth century are made up of masses of conventional foliage interspersed with the animal figures of the preceding centuries. Continuous borders, with vignettes, tail-pieces, &c. were also prevalent in later times, and some manuscripts are ornamented with very artistic designs. In the sixteenth century the art of illumination became extinct. Some attempts have been made to revive it by adorning paper, parchment, and vellum with designs in colours or metals.—**BIBLIOGRAPHY:** T. J. Wise, *Reference Catalogue of British and Foreign Autographs and Manuscripts*; J. H. Middleton, *Illuminated Classical and Mediæval MSS.*

Manu'tius, Aldus, or Aldo Manuzio, Italian printer, born about 1447, died 1515. In 1488 he established himself as a printer at Venice, but the first work which he finished was not published till 1494. In the course of the ensuing twenty years he printed the works of the extant Latin and Greek authors, as well as those of his contemporaries. He was the inventor of the

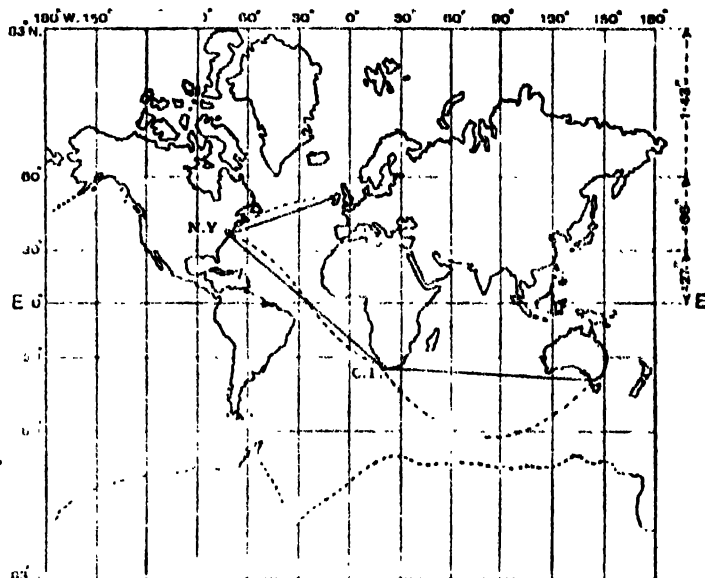
italic or cursive character, hence called *Aldine*. His business was continued by his son Paolo Manuzio, born 1512, died 1574, a man distinguished as a classical scholar no less than as a printer; and by his grandson Aldo, born 1547, died 1597. See *Aldine Editions*.

Manzoni, Alessandro, an Italian poet and novelist, born 1785, died 1873. His chief works are the *Inni Sacri*, a series of sacred lyrics; *Il Cinque Maggio*, a powerful ode on the death of Napoleon; the tragedies *Il Conte di Carmagnola* and *Adelchi*; and his great novel *I Promessi Sposi* (*The Betrothed*). Manzoni strove earnestly to make the Florentine dialect universal in Italy. As a poet he outrivalled all his contemporaries, and his novel is one of the finest works of its kind in the language.

Map, or Mapes, Walter, scholar and poet of the twelfth century, a native of the Welsh Marches, is supposed to have been born in Herefordshire about 1140, and to have died about 1210. He was the author of a curious book, *De Nugis Curialium*, a notebook of the events of the day and of court gossip; and to him is attributed a collection of rhymed Latin verse, in which the abuses of the Church are hit off with vigour and humour. Among the most remarkable of these are the satirical *Apocalypse* and the *Confession of Bishop Goliath*, which contains the famous dream-song beginning with *Meum est propositum in tabernaculo auri*.

Map, a representation of the features of one surface on another. The most important use of the word is in application to the earth. In a map of the earth, the system on which the meridians and parallels (see *Latitude*; *Longitude*) are drawn, or the rule connecting position on the map with position on the earth, is called the *projection*. If the earth were a *developable surface*, so that like a cylinder or cone it could be unrolled upon a plane, map-making would be an easy matter. A map would simply be a copy of the unrolled surface on a reduced scale. The map would be *orthomorphic*, i.e. a small area would retain its shape, or the scale of length would be the same in all directions round a point; it would also be *equal-area*, i.e. the scale of areas would be the same all over the map.

With the earth as it is, a map may have either of those valuable qualities at our discretion, but it cannot have both, and in some important projections it has neither. Of orthomorphic projections the best known is *Mercator's projection*, in which meridians and parallels are straight lines at right angles to each other, the meridians being correctly spaced at their equatorial distances. Every parallel is of the same length, so that the scale is much exaggerated in high latitudes, and the map is useless near the poles. A straight line on the map represents a *rumb*



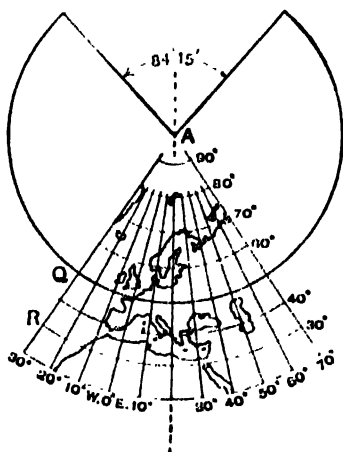
The World on Mercator's Projection

Scale 5000
Broken line

On left, distances of parallels on map from Equator.
great circles. Straight lines are rumb lines

line, i.e. a line cutting the meridians at a constant angle. A ship keeping a constant course must therefore follow a straight line on the map. On account of this convenient property, Mercator's projection is still universally used at sea. Another important orthomorphic projection is the *stereographic*. This is a true projection in the geometrical sense (see *Geometry*), the centre of projection being a point on the surface, and the plane of projection the tangent plane at the antipodal point. In a *conical projection*, meridians are represented by straight lines converging to a centre, and parallels by the concentric circles at right angles to these lines. In the *simple conical projection*, the scale is correct along every meridian, and also along one standard parallel. This projection can be made nearly true to scale over a fairly wide region, and it has been used a great deal for atlas maps. *Bonne's*

projection is a modification, in which the parallels are concentric circles, all divided truly, and the meridians are curves formed by joining up corresponding points on the parallels. This



Map of Europe on simple Conical Projection, with one standard parallel

Scale, 1:250,000,000. Radius of standard parallel (50° N.) 0.84"; distance apart of meridians on standard parallel, 0.11"; distance apart of parallels, 0.17"-0.175".

projection is equal-area, and has been used in official surveys in France, Scotland, and Ireland. Another modified conical projection is the *orthomorphic* with two standard parallels, usually called *Lambert's second projection*. The maps used by the Allies in France in the later stages of the European War were of this type. The *zenithal*, or *azimuthal projection* is a conical projection in which distances from the centre are given to scale, and angles between central radii are shown of their true size, whereas in conical projections in general the complete area round the pole is shown as a sector of a circle. A zenithal projection may have its centre or zenith at any point, not necessarily at the north or south pole as in conical projections in general.

The choice of a projection depends on the purpose of the map. If distribution statistics are to be illustrated, an equal-area map is obviously the one to choose. If distances and bearings from a certain point are wanted, a zenithal map with that point as centre is best. For areas of no great extent, however, the results given by the ordinary projections are hardly distinguishable from each other. The International Map Committee, London, 1909, recommended for the projected map of the world, on the scale 1/1,000,000, the *polyconic* projection, in which the central meridian is divided truly, and the parallels are circles also divided truly, not concentric, but with the radius of each a certain simple function

of the latitude. It has been calculated that on this projection the maximum error of scale of a meridian is 1/1270, and of a parallel 1/3200; and that the greatest alteration in azimuth is six minutes of arc. For the early history of map-making, with illustrations, see *Geography*. See also *Navigation*; *Surveying*.—BIBLIOGRAPHY: A. Germain, *Traité des projections des cartes géographiques*; E. A. Reeves, *Maps and Map-making*; A. R. Hinks, *Map Projections*; Mary Adams, *A Little Book on Map Projection*; A. Stevens, *Applied Geography*.

Maple, a name for trees of the genus *Acer*, nat. ord. *Aceraceæ* or *Sapindaceæ*, peculiar to the northern and temperate parts of the globe. About fifty species are known, distributed through Europe, North America, and different parts of Asia. They are small or large trees, with a sweetish, rarely milky, sap, opposite, deciduous, simple, usually lobed leaves, and axillary and terminal racemes or corymbs of small greenish flowers. Two species are common in Britain, the great maple, often mis-called sycamore (*A. Pseudo-platanus*), and the common maple (*A. campestre*). The wood of the former is valuable for various purposes, as for carving, turnery, musical instruments, wooden dishes, &c. Another well-known species is the Norway maple (*A. platanoides*), often planted in Britain as an orna-



Maple (*Acer campestre*)

A, Male flower. B, Ovary and stamens. C, Fruit. D, Fruit opened, exposing seed.

mental tree. The wood of several American species is also applied to various uses. The sugar or rock maple (*A. saccharinum*) is the most important species; this yields maple-sugar, which

in many parts of North America is an important article of manufacture. A tree of ordinary size will yield from 15 to 30 gall. of sap yearly, from which are made from 2 to 4 lb. of sugar. The knotted parts of the sugar-maple furnish the pretty *bird's-eye maple* of cabinet-makers. Some other American species are the white maple (*A. dasycarpum*), the red or swamp maple (*A. rubrum*), the striped maple or moose wood (*A. pennsylvanicum*), the mountain maple (*A. spicatum*), the vine maple (*A. circinatum*), and the large-leaved maple (*A. macrophyllum*).

Mâquis (Fr.), or Macchia (It.), a kind of dense, low, scrubby forest, composed of a great variety of shrubs and small trees with leathery, usually entire, evergreen leaves, characteristic of the Mediterranean lands with cool, moist winters, and hot, dry summers. It is seen to perfection in Corsica. The same sort of vegetation recurs in other countries with a similar climate, such as the Cape, California ('chapparal'), Chile, and Western Australia.

Mar'abou-stork, the name given to two species of storks, the delicate white feathers beneath the wing and tail of which form the beautiful and ornamental marabou-feathers. One species is a native of West Africa (*Leptoptilus crumenifer*); another is common in India, where it is generally called the *adjutant* (q.v.).

Mar'abouts, or Marabuts, among the Berbers of Northern Africa a sort of saints or sorcerers, who are held in high estimation, and who exercise in some villages a despotic authority. They distribute amulets, affect to work miracles, and are thought to exercise the gift of prophecy. Among the Riff more than among the more Arabicized Berbers (Jebala) the Koranic doctrine and precepts are only nominally embraced, and the *marabouts* is a multitudinous array of marabouts. The name Marabouts is also used as equivalent to *Almoxarabes* (q.v.).

Maracaibo, the chief seaport of Venezuela, provincial capital of Zulia, on the strait uniting the *lago* and Gulf of Maracaibo. The harbour is small and bad between October and April. Coffee, rubber, cocoa, and sugar, with some timber, hides, and ores, are exported. There is a wireless station. Pop. (estimated), 48,500. The gran lago de Maracaibo is a large Venezuelan freshwater lagoon 130 miles long, connected by a strait with the Gulf of Maracayibo (or Venezuela), an arm of the Caribbean. The gulf was discovered by Ojeda in 1499, and, from the houses of the indigenous population being built on piles, he named the district Venezuela (Little Venice).

Marajo, or Johannes, an island of Pará, Brazil, formed by the estuaries of the Amazon and Pará (Tocantins); length, 180 miles; breadth, 125 miles. Rubber is yielded.

Maranhão, a maritime state of North-

Eastern Brazil, bounded by the Rivers Gurupy, Parnahyba, and the Middle Pará (Tocantins). It is partly afforested, well watered, and produces vanilla, tobacco, cotton, sugar, timber, copper, and gold. São Luiz is the capital. Area, 177,515 sq. miles; pop. (1920), 853,050.

Maranta'cese, an order of endogenous plants, growing in tropical countries; called also *Cannaceae*. They are perennial herbs with fibrous roots or fleshy creeping rhizomes, alternate simple leaves with sheathing footstalks, and irregular racemose or panicle flowers. The type-genus is Maranta (arrowroot).

Marat (ma-râ), Jean Paul, one of the most radical leaders of the French Revolution, born near Neufchâtel 1744, died 1793. He studied medicine at Paris, and previous to 1789 had spent many years in travel, visiting London, Edinburgh, Dublin, Amsterdam. The first breath of the Revolution, however, brought him to the front, and when Danton instituted the club of the Cordeliers, Marat became the editor of the *Publiciste Parisien*, better known under its later title *L'Ami du Peuple*, which was again changed to the *Journal de la République Française*, a journal which was the organ of that society, and soon became the oracle of the mob. It early advocated the most extreme measures, and the tone became more furious as Marat was inflamed by the prosecutions of the authorities. His paper was issued from various places of concealment until 10th Aug., 1792, after which he took his seat at the Commune, and played a leading part in the assassinations of Sept., 1792. He was a member of the Committee of Public Safety, and of the Convention, where General Dumouriez and the Girondists, who endeavoured at first to prevent his taking his seat, were the special objects of his attack. The establishment of the revolutionary tribunal, and of the committee for arresting the suspected, was adopted on his motions. On the approach of 31st May, as president of the Jacobin Club he signed an address instigating the people to an insurrection, and to massacre all traitors. For this Marat was delivered over to the revolutionary tribunal, which acquitted him; and the people received him in triumph and covered him with wreaths. He was assassinated shortly after by Charlotte Corday. His remains were deposited in the Pantheon with national honours, but were subsequently removed. — Cf. E. B. Hax, *Jean Paul Marat: the People's Friend*.

Marāthi (ma-râ't'hê), a language of India, closely allied to Sanskrit and written in the Sanskrit character. It is the vernacular of some sixteen millions of people, mostly in the North-West Deccan. It is divided into two great groups, the Konkani, and the Dakhani, and comprises several dialects. See *India*.

Mar'athon, a village of ancient Greece, in Attica, about 20 miles north-east of Athens. It was situated (probably on the site of the modern Vrana) on a plain which extends for about 6 miles along the sea-shore, with a breadth of from $1\frac{1}{2}$ to 3 miles. It is famous for the overthrow of the Persians by the Athenians under Miltiades, 490 B.C.

Marattiaceæ, the principal family of Eusporangiate Ferns (q.v.), comprising about twenty-five species of tropical ferns, with stout, fleshy stems, and large, leathery, usually pinnate leaves. The sporangia, generally united into groups, are bulky and numerous, and the prothallus is also stouter and longer-lived than that of ordinary ferns. Chief genera: *Angiopteris*, *Danaea*, *Marattia*, *Psaronius* (fossil).

Marble, the name given to certain varieties of limestone which show ornamental characters when polished, and which, both from their durability and the beauty of the tints of many of them, have at all periods of the world been greatly in request for purposes of art or ornament. White statuary marble is a mass of pure granular crystals of calcite. Marbles have been divided into many varieties, such as *marbles of a uniform colour*, comprehending solely those which are either white or black; *variegated marbles*, in which the spots and veins are interlaced and disposed without regularity; *shell marbles*, in which the fossil shells provide an ornamental feature; *cipollino marbles*, which are veined with mica; and *breccia marbles*, which are formed of angular fragments of various marbles united by a cement of some different colour. Black marbles are coloured by a small percentage of carbon; red by iron hydroxide; and green by chlorite, green mica, or, in some handsome examples, by serpentine. By *antique marbles* is understood those kinds made use of by the ancients, the quarries of which have in several cases been reopened by modern enterprise. These include Parian marble, Pentelic marble, Carrara marble, *rosso antico*, *giallo antico*, *verde antico*, &c.

Marburg, a town of Hesse-Nassau, Germany, on the Lahn. Among its buildings are the thirteenth-century castle of the Landgraves of Hesse, the university (1527), and the church of St. Elizabeth, built by the Teutonic Knights. Pop. 23,000.

Marburg, a town of Styria, Yugo-Slavia, on the Drave. There is a sixteenth-century cathedral, and a bishop's palace. Railway rolling-stock and boots are manufactured; trade is good in wine and agricultural produce. Pop. 28,000.

Mar'casite, orthorhombic iron pyrites or blausphide of iron. It is of a paler colour than ordinary iron pyrites, the cubic pyrite being

nearly of the colour of tin, as is seen when it is cleaned with hydrochloric acid. It decomposes on exposure to the atmosphere more readily than pyrite, and fossil remains replaced or infilled by it commonly go to pieces in collections.

Marcellus, Marcus Claudius, a Roman general, five times consul (222, 215, 214, 210, and 208 B.C.); the first Roman who successfully encountered Hannibal in the second Punic War; and the conqueror of Syracuse (212 B.C.). He was killed in a skirmish with the Carthaginians in 208 B.C.

March, originally the first month of the Roman year. Till the adoption of the new style in England (1752), the 25th of March was the first day of the legal year; hence January, February, and the first twenty-four days of March have frequently two years appended, as 1st January, 170 $\frac{1}{2}$, or 1701-2. Scotland adopted January as the first month of the year in 1599.

Marchantiales, a family of Liverworts, distinguished by the flat, lobed thallus, usually fleshy and with complicated internal structure, and the sessile or shortly-stalked capsule, which bursts irregularly. The type-genus is *Marchantia*; *M. polymorpha* is a very common plant.

Marches, the frontiers or boundaries of a territory. The term is most familiar as applied to the boundaries between England and Wales, and England and Scotland. The latter were divided into three portions, the western, the eastern, and the middle marches, each of which had courts peculiar to itself, and a kind of president or governor, who was called Warden of the Marches. What is known as *riding the marches* is a practice still observed occasionally in some of the burghs of Scotland, the original object being to preserve in the memory of the inhabitants the limits of their property. In observing this practice the magistrates and chief men of the town, mounted on horseback, ride in procession along the boundaries of the town property, and perform various ceremonies.

Marches, a maritime compartimento of North-Eastern Italy, lying between the Apennines and the Adriatic, and comprising the provinces of Pesaro e Urbino, Ancona, Macerata, and Ascoli Piceno. Formerly a Papal possession, Marches was annexed to Italy by Victor Emmanuel (1860). Area, 3741 sq. miles; pop. (estimated), 1,133,265.

Mar'cion, the founder of an ascetic Gnostic sect, called after him Marcionites, was born at Sinope about the beginning of the second century of our era, his father being Bishop of Sinope. He went to Rome about A.D. 140, and founded a system which assumed the existence of three original principles—the supreme and invisible, whom Marcion called the Good; the visible God, the Creator; and the Devil, or perhaps matter,

the source of evil. Marcion could not perceive in nature, or in the Old Testament, the same love which was in the the Gospel of Christ. He accordingly made the Creator, the God of the Old Testament, the author of suffering. Jesus was not the Messiah promised by this being, but the Son of the unseen God, who took the form, but not the substance of man. Marcion denied the resurrection of the body; he condemned marriage, thinking it wrong to increase a race born in subjection to the harsh rule of the Creator. He was vigorously attacked by Tertullian and others, but his sect lasted for several centuries.

Marcoman'ni, or **Markomanni**, the name of an ancient German tribe or tribal league, apparently originally marchmen or borderers on the Rhenish frontier. They subsequently migrated east, displaced the Boii from their territory (the modern Bohemia), and under their king, Maroboduus, formed a great Marcomannic confederacy to hinder the extension of the Roman power beyond Pannonia. Being defeated, however, by a rival confederacy composed of the Cherusci and their allies, they entered into more or less friendly relations with Rome until the time of Domitian, whom they defeated. Trajan and Hadrian kept them in check, but in A.D. 166 they invaded Pannonia, and commenced the long *Marcomannic War*. Aurelius drove them back, and Commodus purchased peace from them, but they continued to make incursions into Rhætia and Noricum, and in the reign of Aurelian penetrated Italy as far as Achaia, and even threatened Rome itself. After that, however, they practically pass out of history.

Marconi, Guglielmo, inventor of a practical system of wireless telegraphy, was born at Bologna 1874, his mother being an Irishwoman, and was educated at Leghorn and at Bologna University. After experimenting at Bologna, in 1899 he established wireless communication across the Channel, between England and France. In 1901 he established communication between Cornwall and St. John's, Newfoundland (2100 miles), in 1902 between England and Canada, and in the same year between England and the United States. His system is now used by Lloyd's and the principal shipping companies, by the British and Italian Admiralties, and at various land stations. In 1904 the *Cunard Daily Bulletin*, the first ocean daily newspaper, was published on the *Campania*, and other liners have followed suit. Marconi shared the Nobel Prize for physics in 1909.

Mardin', a town of Kurdistan, Asia Minor, 50 miles S.E. of Diarbekr, on the slopes of a castle-crowned hill. It has bazars and khans. Pop. 25,000.

Maremma, a coastal marsh area of Tuscany, Italy, extending along the Tyrrhenian seaboard from Cecina to Orbetello, and inland for 15 to 20 miles. Anciently it was drained by underground channels which fell into disrepair, and modern attempts to improve the district have met with slight success.

Marengo, a village of Alessandria, North Italy, where Napoleon defeated the Austrians under Melas, 14th June, 1800. As a consequence North Italy was ceded to France.

Mare's Tail (*Hippuris*), a genus of plants with whorled narrow leaves and small inconspicuous flowers set in their axils. They are aquatic or marsh plants. *H. vulgaris* is common in Great Britain.

Margam, an urban district of Glamorgan-shire, Wales, a coal-mining centre, near Aberavon. It has remains of a Cistercian abbey founded in 1147. Pop. (1921), 17,786.

Margaret, Queen of Denmark, Norway, and Sweden, the daughter of Waldemar IV, King of Denmark, born at Copenhagen in 1353, died in 1412. She was married to Haakon VI, King of Norway, in 1363. The death of her husband in 1380 placed Norway in her hands; that of her son Olaf in 1387 enabled her to secure the throne of Denmark, to which she had previously brought about his election; and after defeating Albert, the Swedish king, she also obtained possession of the throne of Sweden. She endeavoured to place the union of the three kingdoms on a permanent basis by the celebrated Act of Union, or Treaty of Kalmar (1397), and raised herself to a degree of power then unequalled in Europe from the time of Charlemagne.

Margaret, the daughter of Edward, and elder sister of Edgar Atheling, after the Norman Conquest took refuge with her brother at the court of Malcolm Canmore of Scotland, whom she shortly afterwards married. She is said to have introduced into Scotland the higher culture of the English court, and to have effected many reforms in the Scottish Church. She died in 1093. Her daughter Matilda married Henry I.

Margaret, known as *Margaret of Angoulême*, sister of Francis I of France, was born at Angoulême in 1492, died in 1549. She was brought up at the court of Louis XII, and married the duc d'Alençon in 1509, became a widow in 1525, and in 1527 was espoused to Henri d'Albret, comte de Béarn and titular King of Navarre. From this time she resided at Béarn, assisting in the development of the resources of the small kingdom, and making it a centre of liberal influence. Many Protestants took refuge in her territories; and her name is closely linked with those of Rabelais, Dolet, Marot, and the leading men of the period. She herself possessed no ordinary culture, being credited with a know-

ledge of six languages and the authorship of several works, of which the chief were: *Le Miroir de l'âme pécheresse*, printed in 1553 and condemned by the Sorbonne for its Protestant tendencies; the *Heptaméron*, a collection of tales in imitation of the *Decameron* of Boccaccio, and first printed in 1559; and a collection of poems published in 1547 under the title of *Marguerites de la Marguerite des princesses*. She left one child, Jeanne d'Albret, afterwards mother of Henry IV. Cf. M. G. Fawcett, *Five Famous Frenchwomen*.

Margaret of Anjou, daughter of René of Anjou and Provence, titular King of Sicily, was born in Lorraine in 1420, and died in 1482. She married Henry VI of England in 1445. The king's weakness gave scope for her ambition, and her power being contested by the Duke of York, a claimant of the throne by an elder line, the protracted Wars of the Roses commenced. At first victorious, she was afterwards compelled to flee to Scotland, but raising an army in the north, she secured, by the battles of Wakefield (1460) and St. Albans (1461), the death of York and the release of the king. Her army, however, was soon afterwards annihilated at Towton (1461), and Edward (IV), the son of the late Duke of York, was declared king. She succeeded in obtaining assistance from Louis XI of France, but was once more defeated, and took refuge in France. Warwick then became embroiled with the young king, and determined to replace Henry on the throne. Edward was in turn obliged to escape to the Continent, but, obtaining assistance from the Duke of Burgundy, returned and defeated Warwick at Barnet (1471). Margaret, collecting her partisans, fought the battle of Tewkesbury (1471), but was totally defeated. She and her son were made prisoners, and the latter was killed. Henry soon after died or was murdered in the Tower, and Margaret remained in prison four years. Louis XI ransomed her for 50,000 crowns.

Margarine. Oleomargarine, or margarine, is used as a substitute for normal dairy butter. The better varieties usually have 'oleo oil' as their base, and form a food of very good quality.

Butter fat is a mixture of the glycerides of oleic, stearic, palmitic, lauric, and other acids. (A glyceride is a chemical combination of a fatty acid and glycerol.) Since the same glycerides are present in other fats and fatty oils, a product can be made closely resembling butter, physically, chemically, and in flavour, from substances outside the province of the dairy. The best fat is removed from newly killed oxen or sheep, washed to remove blood, &c., chilled quickly in ice-water, finely shredded and rendered, i.e. melted with a little water and sodium carbonate at the lowest possible tem-

perature, usually between 65° to 66° C. The product, called *Premier Jus*, is allowed to solidify for twenty-four hours, when it is hydraulically pressed, and the soft oil obtained is 'oleo oil' or 'oleopalmitin', the yield being 50 to 60 per cent on the fat. Oil-refining can be so carried out that a colourless and tasteless oil is obtained, which may therefore be easily coloured and flavoured as desired.

Twenty-four gallons of separated pasteurized milk containing a butter 'starter', which is a culture carefully prepared in the bacteriological laboratory, is mixed with enough oleo oil to give one thousand pounds of margarine. For the highest qualities, 10 per cent creamery butter, or cream, may be added. Churning takes one hour, and is done at a temperature of 20° to 45° C., the lower temperature preserving the flavour and thus giving a better product. In this way the 'oil' is given the smell and taste of butter. According to the grade desired, neutral lard, coco-nut oil (the substitute for butter used by vegetarians), cotton-seed, earth-nut, palm kernel, sesame, or other oils may be added, the proportions depending upon the destination of the product—more oleo oil for a warm climate, more neutral lard for a cold climate. For preparing lard, the perfectly fresh leaf of the pig is rendered between 40° to 50° C., producing best quality neutral lard with about 0.25 per cent free fatty acid. This lard is incorporated with the oleo oil, milk, &c.

During the churning, casein and milk-sugar may be added to confer the properties of browning and frothing, as butter does when melted. 'Elaïne', a product from egg-yolk, may also be added. The churned mixture is run in a very thin stream between two large drums revolving in the same direction, set close together, and internally cooled to -10° C. In this way all ingredients are retained, the margarine is set, and a uniform flavour and texture is obtained. The margarine is scraped from the drums, allowed to ripen, kneaded to get rid of excess water and obtain uniformity. At an earlier stage, salt and colouring matter may or may not have been added. These help to give the product the flavour and appearance of butter. The same colouring matter as that used by dairymen for butter is employed, viz. annatto dissolved in vegetable oil, extract of carrot or marigold, turmeric and alum, &c. Sometimes an azo dye is used, but a vegetable dye is considered better. The margarine is then moulded and packed for market.

As a food, some hold that margarine is scarcely inferior to butter; but others deny this, insisting on the paramount importance of the vitamins which are present in normal butter fat but not in margarine.

Margari'ta, a Caribbean island, separated by the Straits of Margarita from Venezuela, to which it belongs. It is mountainous (Macanao, 4400 feet). The Margarita littoral is a Caribbean pearl-fishery. La Asunción (pop. 3000) is the capital, but the harbour and town are in great part ruinous. Pampatar is the chief port. Margarita was discovered by Columbus (1498), and is now the main constituent of the insular state of Nueva Esparta (q.v.). Pop. about 50,000.

Mar'gate, a municipal borough and watering-place, Isle of Thanet, Kent, England, served by South-Eastern & Chatham Railway and in steamboat communication with London, for those inhabitants it forms a favourite resort. It has a curious grotto, discovered in 1837, and many amusements. Margate was much damaged by German air-craft during the European War. Pop. (1921), 40,475.

Mar'gay, an American animal of the cat kind, the *Felis tigrina*, which ranges from Mexico to Paraguay. It is about the size of the domestic cat, is of a pale-fawn colour, with black bands on the fore-parts, and leopard-like spots on the hind-parts and on the long bushy tail. It has been domesticated and made very useful in cat-killing.

Marghilan, a town of Ferghana, Turkistan, Russian Central Asia. Silk and woollen goods are manufactured. Marghilan is the traditional burial-place of Alexander the Great. Pop. 13,320. Nine miles south is Novo Marghilan, a European-style city, and nominal capital of the province. Pop. about 12,000.

Mar'grave (Ger., *markgraf*, count of the mark), originally a commander entrusted with the protection of a *mark*, or country on the frontier. The margraves acquired the rank of princes, and stood between counts and dukes in the former German Empire.

Maria Theresa, Queen of Hungary and Bohemia, Archduchess of Austria, and Empress of Germany, daughter of the Emperor Charles VI, was born at Vienna 1717, and died 1780. In 1736 she married Francis Stephen, duo de Lorraine. On the death of her father in 1740 she ascended the throne of Hungary, Bohemia, and Austria, and a little later declared her husband joint ruler. Her accession was in accordance with the Pragmatic Sanction, but her claims were at once contested. (See *Austria-Hungary*.) During the time of peace which followed the Treaty of Aix-la-Chapelle (1748), Maria Theresa, with the aid of her husband and the minister Kaunitz, made great financial reforms; agriculture, manufactures, and commerce flourished, the national revenue greatly increased, and the burdens were diminished. The Seven Years' War once again reduced Austria to a state of great exhaustion and destitution. Of the six-

teen children which she bore to the emperor ten survived her, one of whom was the unfortunate Marie Antoinette.—**BIBLIOGRAPHY:** M. Moffatt, *Maria Theresa*; J. F. Bright, *Maria Theresa*.

Marie Antoinette (An-twà-net; Marie Antoinette Joseph Jeanne de Lorraine), Archduchess of Austria and Queen of France, the youngest daughter of the Emperor Francis I and of Maria Theresa, was born at Vienna 2nd Nov., 1755; guillotined at Paris 16th Oct., 1793. Married at the age of fifteen to the Dauphin, afterwards Louis XVI, her manners were ill-suited to the French court, and she made many powerful enemies by her contempt for its ceremonies. The affair of the diamond necklace, in which the Cardinal Louis de Rohan, Joseph Balsamo, comte de Cagliostro and the comtesse de Lamotte (q.v.) were the chief actors, cast a stigma on her, and the *canaille* subsequently laid every public disaster to her charge. There is no doubt she had great influence over the king, and that she constantly opposed all measures of reform. The enthusiastic reception given her at the guards' ball at Versailles on 1st Oct., 1789, raised the general indignation to the highest pitch, and was followed in a few days by the insurrection of women, and the attack on Versailles. When practically a prisoner in the Tuilleries, it was the queen who advised the disastrous flight of the royal family (June, 1791). On 10th Aug., 1792, she heard her husband's deposition pronounced by the Legislative Assembly, and accompanied him to the Temple Prison, where in Jan., 1793, they were parted after Louis's condemnation by the Convention. In August she was removed to the Conciergerie; and in October she was charged before the revolutionary tribunal with having dissipated the finances, exhausted the Treasury, corresponded with the foreign enemies of France, and favoured the domestic foes of the country. She defended herself vigorously, and heard the sentence of death pronounced with a calmness born of hopeless resignation, which did not forsake her when the sentence was carried out the following morning.—**BIBLIOGRAPHY:** The best modern books are Pierre de Nolhac's *Marie-Antoinette Dauphine* and *La Reine Marie-Antoinette*. (The author is conservator at Versailles.)

Marie de Medici (mà-rè de med'i-ché), the daughter of Francis II of Tuscany, was born in 1573, and died in 1642. She married in 1600 Henry IV of France. On the assassination of Henry she became regent, but proved utterly incompetent to rule. Her partiality for unworthy favourites caused her deposition and imprisonment. She escaped, and after wandering through several countries died in misery at Cologne.

Marie Galante, a French West Indian island, one of the five dependencies of Guadeloupe. It

produces sugar, coffee, tobacco, indigo, and cotton. The name Marie Galante is that of the ship of Columbus, who discovered the island (1493). Pop. about 18,000.

Marie Louise, second wife of Napoleon I, born in 1791, died 1847, eldest daughter of the Emperor Francis I of Austria. Her marriage with Napoleon took place in 1810 after the divorce of Josephine, and in 1811 she bore him a son. After his overthrow she received in 1816 the Duchies of Parma, Piacenza, and Guastalla, which she governed till her death. At Napoleon's death she made amorganatic marriage with her chamberlain, Count Neipperg.

Marlenbad, or Mariánské Lázně, since 1808 an inland watering-place, formerly of Bohemia, Austria, but now of Czechoslovakia. It was often visited by King Edward VII. Pop. about 6000.

Marlenburg, a town of East Prussia, on the Nogat. There are saw-, cotton-, and flour-mills. Marlenburg was the seat of the Grand Master of the Teutonic Order from 1309. The town passed to Poland in 1457. The enormous castle of the Knights is still extant. Pop. about 14,000.

Mar'igold, a name of several composite plants. The common marigold (*Calendula officinalis*) is a native of France and of the more southern parts of Europe. It is an annual, from 1 to 2 feet high, with large deep-yellow flowers. It is as prolific as any weed, and was formerly used in broths and soups, partly to give colour and partly as an aromatic seasoning. It had also many medicinal virtues assigned to it. A number of species of this genus are indigenous to the Cape of Good Hope. The so-called African marigold and French marigold, common in flower borders, are both Mexican species, and have brilliant flowers. They belong to the genus *Tagetes*. The corn-marigold is *Chrysanthemum segetum*; the fig-marigold is a species of *Mesembryanthemum*; the marsh-marigold is *Caltha palustris*.

Marinduque, one of the Philippine islands, directly south of Luzon, and a division of the province of Talayay. Copra, rice, hemp, and coco-nuts, with some tobacco, are produced, and cattle are raised. It is well wooded. Boac is the chief town. Area, 852 sq. miles; pop. 53,000.

Marines, the name used to designate certain bodies of troops raised and organized for the dual purpose of serving either on shore or afloat on His Majesty's ships. In the days when troops were raised as required for special campaigns or undertakings it did not much matter whether they fought on land or at sea; in either case it was largely a matter of hand-to-hand encounters, and bodies of troops were used indiscriminately either on land or on board ship. The first record

of a body of troops being raised especially for the sea service is in 1664, when Charles II—no doubt with the idea of somewhat increasing his standing army while at the same time 'hoodwinking the Parliament by calling it a sea-regiment—gave orders for the embodiment of 'The Duke of York and Albany's Maritime Regiment of Foot', to consist of 1200 'land soldiers'. This maritime regiment was first dressed 'in yellow coats with scarlet breeches and stockings, but this uniform was very soon changed to scarlet coats, lined yellow, with dark grey breeches.

For the next ninety years the fate of the maritime regiments was identical with that of most other regiments of the period; that is to say, they were raised, disbanded, transferred to the line, or raised again as necessity arose. The present 1st East Lancashire, 1st East Surrey, and 1st Duke of Cornwall's Light Infantry all started life as marine or maritime regiments. Then in 1755 it was decided to raise a permanent force of marines, which was to consist of fifty companies formed into three divisions, with head-quarters at Chatham, Portsmouth, and Plymouth. The uniform was red with white facings. Thereafter, wherever there was fighting or naval activity, the marines held their own, and in 1802, in recognition of their services, were designated 'Royal' and their facings altered from white to blue, remaining so to the present day. In the following year certain artillery companies provided by the Royal Artillery were attached to the corps, and in the 'fifties of last century these were definitely incorporated in the Royal Marines, which became separated into two distinct divisions, known as the Royal Marine Artillery and the Royal Marine Light Infantry. And so they remain, the uniform being blue in the first and scarlet in the second, in each case with the Royal Marine badge, the 'globe and laurel', and the motto *Per Mare per Terram*. The Royal Marines are administered by the Admiralty, and the expense of the force is a charge against the Admiralty vote. Men enlist for twelve years, with power to re-engage to complete twenty-one; selected men may be permitted to continue to serve beyond twenty-one years. When serving ashore the Royal Marines are subject to the Army Act, when afloat to the Naval Discipline Act.

Mario, Giuseppe, Marquis di Candia, a famous tenor, born at Turin in 1808, died 1883. In Paris in 1838, under the assumed name of Mario, he accepted an appointment as first tenor of the opera, and a year later was secured for the Théâtre Italien. In 1839 he made his first appearance in London, and for many seasons subsequently divided his time between London, Paris, and Russia. He took farewell of the London stage in 1871, and retired to Paris,

afterwards to Rome; but subsequently lost his large fortune by speculation.

•**Mariotte**, Edme, a French mathematician and natural philosopher, born in Burgundy 1620, died in 1684. He made many important discoveries in hydrostatics and hydraulics. See *Boyle's Lenc.*

Maritime Province, the geographical nomenclature indicating proximity to the sea or ocean, e.g. the Maritime Provinces of Canada—Nova Scotia, New Brunswick, and Prince Edward Island. The name (Russ. *Primorskaya Oblast*) is particularly applied to the narrow Siberian coastal belt extending northwards to Ayun from the Korean-Manchurian frontiers. There is agriculture in the south, and some gold and coal. Khabarovsk is the capital, and Vladivostok the port. Area, 260,486 sq. miles; pop. (estimated), 632,000.

Marit'za (ancient Hebrus), a river rising in the Rhodope Mountains (Bulgaria) and flowing through Eastern Roumelia, south-east to Adrianople, where it bends to the south-west, and falls into the Egean Sea by the Gulf of Enos. It is over 300 miles long, and navigable to Adrianople, about 100 miles from its mouth.

Mariupol, a seaport of Ekaterinoslavl, Southern Russia, on the Sea of Azov; the terminus of a branch of the Kharkov-Taganrog Railway. Cereals, coal, and linseed are exported. Pop. about 54,000, mainly Greeks.

Ma'rius, Gaius, a Roman general, born 157 B.C., of obscure parents, at the village of Cercetræ, near Arpinum, died in 86 B.C. He served with distinction at Numantia in 134 B.C. under Scipio Africanus; was made tribune of the people in 119, and acquired much popularity by his opposition to the nobles. In 115 B.C. he was appointed prætor, and a year later prætor of Spain, which he cleared of bandits; he also increased his influence by his marriage with Julia, the aunt of Julius Cæsar. In 109 B.C. he accompanied the Consul Q. Cæcilius Metellus as his lieutenant in the Jugurthine War. He brought this war and the war in Transalpine Gaul against the Teutons to a victorious close; and was chosen consul six times. On the outbreak of the war against Mithridates, Marius, who had long been jealous of Sulla, endeavoured to deprive him of his command, and in the struggle which followed was compelled to flee from Italy. After hairbreadth escapes he landed in Africa amid the ruins of Carthage, and remained there until recalled by Cinna, who had headed a successful movement in his favour. In company with Cinna he marched against Rome, which was obliged to yield, the entry of Marius and his followers being attended with the massacre of most of his chief opponents. On the completion of the term of Cinna's consulship he

declared himself and Marius consuls, but the latter died seventeen days later at the age of seventy. —Cf. A. H. J. Greenidge, *History of Rome*.

Marivaux (mà-ré-vô), Pierre Carlet de Chamblain de, French dramatic writer and novelist, born at Paris 4th Feb., 1688, died 13th Feb., 1763. After writing three or four novels and a series of articles of the *Spectator* type, from 1720 onwards he produced a large number of plays, the best being the *Surprise de l'Amour* (1722), the *Jeu de l'Amour et du Hasard* (1730), and *Les Fausses Confidences* (1737). They were characterized by a certain skillfully embroidered phrasing which gave rise to the term *marivaudage*. Two uncompleted novels, *Marianne* and the *Paysan Parvenu*, contain much excellent work. He was made an Academician in 1736.—Cf. Jean Fleury, *Marivaux et le Marivaudage*.

Mar'joram (*Origanum*), a genus of plants of the nat. ord. Labiatae. The common marjoram (*Origanum vulgare*), a native of Britain, is a perennial under-shrub, growing among copse-wood in calcareous soils. The leaves are small and acute; the flowers reddish, in clustered spikes. Sweet marjoram (*O. Majorana*) is a biennial, cultivated in gardens. As soon as it blossoms it is cut and dried for culinary use, being employed as a seasoning.

Mark (A.-Sax. *marc*; Ger. *mark*), a term formerly used in England for a money of account, and in some other countries for a coin. The English mark was two-thirds of £1 sterling, or 13s. 4d.; and the Scottish mark, or *merk*, was two-thirds of £1 Scots, or 13s. 4d. sterling. In the coinage of Germany the *mark* was, before the European War, a coin of nearly the same value as the English shilling. In 1922 it was worth only a fraction of a penny. A *mark banco* used to be a money of account in Hamburg equal to nearly 1s. 6d.

Mark, St., the Evangelist, according to the old ecclesiastical writers, the person known in the *Acts of the Apostles* as "John, whose surname was Mark" (*Acts*, xii, 12, 25), for many years the companion of Paul and Peter on their journeys. His mother, Mary, was generally in the train of Jesus, and Mark was himself present at a part of the events which he relates in his gospel, and received his information partly from eye-witnesses. A cousin of Barnabas (*Col.* iv, 10), he accompanied Paul and the former to Antioch, Cyprus, and Perga in Pamphylia. He returned to Jerusalem, whence he afterwards went to Cyprus, and thence to Rome. He was the cause of the memorable 'sharp contention' between Paul and Barnabas. Of the close of his career nothing is known; and it is by no means certain even that the various passages, on which the

Church has based the biographical notes already cited, uniformly refer to the same individual. See *Gospels*. — Cf. F. C. Burkitt, *The Gospel History and its Transmission*.

Markham, Sir Clements Robert, English geographer and traveller, born 1830, died 1916. Educated at Westminster School, he was in the navy from 1844 to 1851, after which he travelled in Peru, and published *Cuzco and Lima* (1856). In 1865-6 he visited Ceylon and India, and in 1867-8 accompanied the Abyssinian expedition, an account of which he wrote. He was made K.C.B. in 1890, and held several Government appointments. Other works of his are: *Life of the Great Lord Fairfax*, *Sketch of the History of Persia*, *Peruvian Bark*, *The War between Peru and Chile*, and a *Life of Columbus*.

Marl, a natural earthy substance, such as the 'chalk marl', essentially composed of calcium carbonate and clay in various proportions. In some marls the argillaceous ingredient is comparatively small, while in others it abounds, and furnishes the predominant characters. The most general use of marl is to improve soils; the calcareous matter serves to lighten heavy clays, while the argillaceous matter may be useful in rendering sands more retentive of water. The quicker action and fine division of slaked lime, which passes promptly into calcium carbonate in the soil, has now generally led to its substitution for marl as a lightener of soils, and for other purposes for which calcium carbonate is required.

Marlborough, John Churchill, Duke of, English general and statesman, second son of Sir Winston Churchill, born at Ashe, in Devonshire, in 1650, died 16th June, 1722. At the age of twelve he became page to the Duke of York (afterwards James II), by whom at sixteen he was appointed an ensign. He was present at the siege of Tangiers, and soon after his return rose to the rank of captain. In 1672 he accompanied the Duke of Monmouth to assist Turenne against the Dutch. At the siege of Maastricht he distinguished himself so highly as to obtain the public thanks of the King of France. On his return to England he was made lieutenant-colonel, and through the influence of his sister Arabella, mistress of the Duke of York, his advancement was rapid. He had a regiment of dragoons presented to him, and strengthened his influence at court by his marriage with Sarah Jennings, an attendant upon the princess afterwards Queen Anne. In 1682 he obtained the title of Lord Churchill of Eyemouth, and a colonelcy in the guards. On the accession of James II he was appointed Ambassador to France, and soon after his return was created Baron Churchill of Sundridge, and raised to the rank of general. The same year he suppressed the

rebellion of the Duke of Monmouth. On the arrival of the Prince of Orange he joined him at Axminster, and was rewarded by the earldom of Marlborough, and the appointment of commander-in-chief of the English army in the Low Countries. The following year he served in Ireland, where he reduced Cork, Kinsale, and other places. In 1691 he was suddenly dismissed from all his employments and committed to the Tower on the charge of high treason, but soon obtained his release; though it appears that the suspicions against him were not without foundation. On the death of Queen Mary he was made a Privy Councillor, and appointed governor to the young Duke of Gloucester; and in 1701 was created by King William commander-in-chief of the English forces in Holland, and also Ambassador Plenipotentiary to the States-General. Still greater honours awaited him on the accession of Queen Anne in 1702, when he was created captain-general of all the forces at home and abroad, and sent as plenipotentiary to The Hague, where he was also made captain-general by the States. In the campaign of the same year he drove the French out of Spanish Guelders, and took Liège and other towns, for which he was created Duke of Marlborough. In 1704 he stormed the French and Bavarian lines at Donnauwörth, and in the same year, in conjunction with Prince Eugène, gained the victory of Blenheim over the French and Bavarians, headed by Marshal Tallard and the Elector of Bavaria. The nation testified its gratitude by the gifts of the honour of Woodstock and hundred of Wotton, and erected Blenheim Palace for him, one of the finest seats in the kingdom. During the year 1705 he conducted successful negotiations at the courts of Berlin, Hanover, and Venice, and the new emperor, Joseph, presented him with the principality of Mindelheim. On the victory of Ramillies, 1706, a Bill was passed to settle his honours upon the male and female issue of his daughters. In the campaign of 1707 his antagonist was the famous duc de Vendôme, over whom he gained no advantage, and on his return, found that his popularity at court was on the decline. In 1708, in conjunction with Prince Eugène, he gained the battle of Oudenarde. In 1709 he defeated Marshal Villars at Malplaquet, though at a cost ill repaid by the capture of Mons. On the next visit of the duke to England he found that the duchess, by her great arrogance, had so disgusted the queen that a total breach had ensued. Early in 1710 he returned to the army, and with Prince Eugène gained another victory over Villars. During his absence a new ministry, hostile to himself, was chosen, and on his return his command was taken from him, and a prosecution commenced against him for applying the public money to

private purposes. He repaired in disgust to the Low Countries in 1712, but returned a short time before the queen's death, and on the accession of George I was reinstated in the supreme military command. Retiring from all public employments, his mental faculties gradually decayed, and he died at Windsor Lodge, leaving four daughters, who married into families of the first distinction. His duchess, Sarah Jennings, born 1600, died 1744, has been almost equally celebrated for her boundless ambition and avarice. The only son of the Duke and Duchess of Marlborough having died while young, the title fell to the descendants of one of their daughters, the wife of Charles Spencer, Earl of Sunderland, who have assumed the name of Churchill.—**BIBLIOGRAPHY:** William Cox, *Memoirs of the Duke of Marlborough*; G. E. B. Saintsbury, *Marlborough*; S. J. Reid, *John and Sarah, Duke and Duchess of Marlborough*. J. W. Fortescue, *The British Army*.

Marlborough, a municipal borough of Wiltshire, England, on the Kennet, served by the Midland & South-Western Joint and Great Western Railways. Marlborough College (1845) occupies the site of a castle built in the reign of Henry I. The town was a royal demesne at the time of the Domesday survey. Pop. (1921), 4192.

Marlborough, a north-eastern maritime district of South Island, New Zealand, drained by the navigable Wairau River and traversed by the Kaikouras (Mount Tapaue-nuku, 9462 feet). Sheep-farming is extensive; wool, timber, tallow, and hides are exported. Picton, on an arm of Queen Charlotte's Sound, and Blenheim are the chief towns. Pop. (1920), 16,970.

* Marlborough House, London, royal residence, in a garden of 4 acres extent, on the south side of Pall Mall; erected by Sir Christopher Wren between 1709 and 1710 for the first Duke of Marlborough. The house was purchased by the Government in 1817 as a residence for the Princess Charlotte and Prince Leopold (1817-31), passed to Queen Adelaide (widow of William IV) in 1837, and was successively the residence of both Edward VII and George V when Princes of Wales. In 1910 Queen Alexandra took up her residence there.

Marlowe, Christopher, English dramatist and poet, was born in Canterbury on 6th Feb., 1564, and was killed in May, 1593. His father was a shoemaker by trade. He was educated at the King's School, Canterbury, which he entered in 1578, and at Benet College, Cambridge (now Corpus Christi). He matriculated in 1581, took his B.A. degree in 1584, and his M.A. in 1588. Francis Kett, the mystic, who was burnt for heresy in 1589, was a Fellow and tutor of Benet College, and may perhaps

have helped to develop Marlowe's attitude towards religion, an attitude often described as atheistical, but probably merely unconventional. It is likely that Marlowe went to London in 1586, and that soon after his arrival there he joined the Lord Admiral's Company of Players. His career as a dramatist must have begun soon after his career as an actor. Nothing definite is known about his life in London; it was rumoured that he was wild and licentious. Certainly he worked hard, for in six years he wrote six plays, four of which were great successes on the stage. He was criticized by Nash, and attacked by Greene and Gabriel Harvey; he numbered Sir Walter Raleigh and Thomas Walsingham among his friends. He was killed at Deptford late in May, 1593. In 1925 an American scholar, Dr. Holson, brought to light in his *Death of Christopher Marlowe* some valuable information. Marlowe was killed by one Ingram Frizer, and the official cause of the quarrel was the reckoning. The exact truth of the story of Marlowe's death is not yet ascertained, but various exaggerated accounts of it were used by Puritanical writers to point a moral.

Marlowe's earliest extant play is *Tamburlaine the Great*, which was probably produced in 1587. It is in two parts, but is virtually one play in ten acts. At the outset of the play Marlowe with superb self-confidence proclaims himself an innovator:

From jiggling veins of rhyming mother-wits,
And such conceits as clownage keeps in pay,
We'll lead you to the stateliest tent of war,
Where you shall hear the Scythian Tamburlaine
Threatening the world with high astounding terms.

With all its faults of violence and bombast, *Tamburlaine* was incomparably the best tragedy that had as yet been produced on the English stage. It is important not only for its intrinsic merits, which are considerable, but also as a piece of pioneer work. It is the first play to be written in blank verse, as distinguished from mere unrhymed decasyllabic lines. Marlowe's verse, while dignified and majestic, is much more supple and infinitely less monotonous than that of any of his predecessors. *Tamburlaine* is obviously a young man's work, but its exaggeration contributed to its success, and its influence on English tragedy was very great.

The Tragical History of Doctor Faustus was produced in 1588. It is not a well-constructed play, being a series of disconnected scenes rather than a connected whole. Its text is not in a satisfactory condition, and the comic scenes, which contain extremely poor fooling, are, it is believed or hoped, by another hand. Yet *Doctor Faustus* is a memorable play; the speech of Faustus, addressed to Helen, and the concluding scenes of the play and soliloquies of Faustus are

among the best things not only in Marlowe, but in all English drama. Goethe said of this: "How greatly it is all planned!" and thought of translating it. In the great work of his life he extended and embroidered the Faust legend almost beyond recognition; but it may be doubted if he wrote anything that arouses so much pity and terror as the conclusion of Marlowe's play.

The Famous Tragedy of the Rich Jew of Malta was produced in 1589. It is a play of very unequal merits; the first two acts are written in Marlowe's best style, and the last three are feeble and melodramatic. Barrabas is scarcely a more life-like figure than Mr. Punch, whom he resembles in his taste for atrocities. He finally perishes by means of "something lingering with boiling oil in it" which he had prepared for someone else. In spite of some absurdities, this play has many passages of noble poetry in it, notably the opening soliloquy of the Jew.

Richard II, which was produced about 1590, is the most flawless of Marlowe's plays, though not the most magnificent. It is his greatest work as a dramatist, but not as a poet. It is obvious that Shakespeare had this play in mind when he was writing *Richard II*, but he did not improve on the earlier play. The death-scene in Marlowe's play is one of the most moving scenes in all drama, ancient or modern.

Marlowe's other two plays are of comparatively small importance. Both have been preserved in a mutilated and mangled state. *The Massacre at Paris* is notable for little except its strong anti-Catholic tendencies. In *Dido, Queen of Carthage*, in which Nash collaborated, Marlowe failed mainly because he adhered too closely to Virgil, regardless of the different medium in which he was working.

As a poet Marlowe stands almost higher than as a dramatist. His versions of Ovid's *Amores* and of the first book of Lucan's *Pharsalia* are commonplace, but in his *Hero and Leander*, which is a recasting rather than a paraphrase of the poem of Musæus, he has written what may claim to be the greatest as well as the most influential of Elizabethan poems. *Venus and Adonis*, clearly an imitation of it, is pale and colourless in comparison. Among Marlowe's shorter poems *Come live with me and be my love* is, as Walton called it, "choicely good".

Marlowe, although he died so young, was great not merely in promise but in performance. He created blank verse, founded English tragedy, and wrote some of the finest passages of dramatic poetry in the language. He is incomparably the greatest of Shakespeare's predecessors, being as much above Greene, Kyd, and Peele as Shakespeare is above Jonson and Beaumont and Fletcher. Less than three months older than Shakespeare in actual age, he was years older in

development. He was Shakespeare's master, and Shakespeare does not pay any other contemporary a compliment like that paid to Marlowe in *As You Like It*, iii, 5, 82. To no pioneer do English poetry and drama owe so much.—BIBLIOGRAPHY: J. A. Symonds, *Shakespeare's Predecessors*; F. S. Boas, *Shakespeare and his Predecessors*; J. H. Ingram, *Christopher Marlowe and his Associates*; A. W. Verity, *Influence of Christopher Marlowe on Shakespeare's Earlier Style*.

Marmont (mâr-môn), Auguste Frédéric Louis Vieusse de, Duc de Ragusa and Marshal of France, was born 1774, and died in 1852. He became acquainted with Bonaparte, who chose him for his aide-de-camp. In Italy he greatly distinguished himself, and after the battle of Marengo attained the rank of general of division. He obtained the title of duc de Ragusa for his defence of Ragusan territory against the Russians and Montenegrins, was present at Wagram, and after the truce of Znaim was made field-marshal. He afterwards governed the Illyrian Provinces till 1811, when he succeeded Masséna as commander in Portugal. In conjunction with Soult he raised the siege of Badajoz, but was ultimately badly beaten at Salamanca by Wellington. In the campaign of 1813 he held the command of an army corps in Germany, and fought in the battles of Lützen, Bautzen, and Dresden. In 1814 he fought a final battle under the walls of Paris, but, opposition appearing fruitless, he surrendered to the Allies.

Mar'mora, or Marmara, Sea of (ancient Propontis), the sea separating Asia Minor from Europe. It communicates with the Black Sea by the Bosphorus, and with the Ægean and Mediterranean by the Dardanelles; length, about 177 miles; breadth, 50 miles; area, 4500 sq. miles. The name is derived from Marmora (ancient *Proconnesus*), the largest island, noted for its marble and alabaster. The Treaty of Sévres (1920) placed the control of the Sea of Marmora under an Allied Commission.

Marmose, a marsupial quadruped resembling the opossum, but smaller, being about 6 inches in length exclusive of the tail; the *Didelphys murina* of Cayenne, *D. dorsigera* of Surinam. It carries its young about with it on its back.

Mar'moset, or Oulstiti, a name of several small Central and South American monkeys, the smallest of the monkey tribe. They are agile in their movements, possess long, non-prehensile tails, and have a thick woolly fur. They bear a close resemblance to squirrels in general appearance, feed upon fruit and insects, and occasionally upon the smaller birds and their eggs. The marmoset family (Hapalidae) is generally divided into two genera, Hapalé and Midas, of which the most familiar species are the common marmoset (*Hapale Jacchus*) with its varieties

H. penicillata, *H. vulgaris*, &c., and the common or negro tamarin (*Mydas ursulus*).

• **Marmot**, a burrowing rodent mammal of the genus *Arctomys*, belonging to the squirrel family. They are thick-bodied, have short tails and short legs, and live in burrows, which are generally excavated in mountainous situations, and consist of a series of galleries in which whole communities reside. During the winter they lie dormant. The marmots inhabit Europe, Northern Asia, and North America. The Alpine or European Marmot (*Arctomys marmotta*) is found in plenty on the Alps, and is about the size of a rabbit. The Siberian marmot (*A. bobac*) ranges into Eastern Europe. One of the four North American species is the woodchuck (*A. monax*) of the middle states. A close relative of the marmots is the prairie-dog, prairie-marmot, or wistonwish, of North America (*Cynomys Ludovicianus*). Rattlesnakes and ground-owls (*Speotyto cunicularis*) live in the burrows of this animal.

Marne (ancient *Matrona*), a river of France, tributary of the Seine, rises in the Plateau de Langres (Haute-Marne), and joins the Seine at Charenton, 2 miles south-east of Paris; length, 326 miles. Its tributaries are the Ouse, Saulx, and Ornain on the right, and the Grand Morin and Petit Morin on the left. Navigable to Dizier, it forms part of the Marne-Rhine Canal system. The Haute-Marne Canal from Donjeux connects the Marne with the Saône.

Marne, a department of France, part of the pre-Revolutionary province of Champagne, traversed by the River Marne and by the Aisne-Marne, Marne-Rhine Canals. It is a wine-growing (Champagne) district, with some manufactures of marble and chalk-quarries. Châlons-sur-Marne is the capital; Reims, St. Menchould, and Épernay are important. Area, 3167 sq. miles; pop. 366,784.

Marne, Battles of. See *European War*.

Marne, Haute-, a department of France, part of the pre-Revolutionary province of Champagne. The Marne rises in the hilly region, and traverses the department. Cereals are raised, and the vine is extensively cultivated. Chaumont is the capital; Langres, St. Dizier, Nogent, and Bourbonne-les-Bains (watering-place) are important. Area, 2420 sq. miles; pop. 198,863.

Mar'onites, a sect of Eastern Christians, whose origin was a consequence of the Monothelite controversy. (See *Monothelites*.) On the condemnation of the Monothelites by Anastasius, early in the eighth century, the remnant of this party survived in the *Maronites*—so named from their founder Maron—a society of monks in Syria, about Mount Lebanon, which is mentioned as early as the sixth century. They became a warlike mountain people, who de-

fended their political and religious independence boldly against the Mahomedans. Their political constitution is that of a military commonwealth. Since the twelfth century they have several times submitted to the Pope and joined the Roman Catholic Church, without giving up their own peculiarities. Their head is called the *Patriarch of Antioch*, although his residence is in the monastery of Kanobin, upon Mount Lebanon; and he gives an account every ten years to the Pope of the condition of the Maronite Church. Since 1584 there has been a Maronite College established at Rome for the education of clergymen. At present the Maronites are supposed to number about 150,000.—Cf. F. J. Bliss, *The Religions of Modern Syria and Palestine*. **Maros-Vasarhely.** See *Osorrei*.

Marot (mā-rō), Clement, a French epigrammatist and writer of light lyrical pieces, born at Cahors 1495, died in 1544. He wrote *L'Enfer*, a satire; and a modernized edition of the *Romance of the Rose*. His translation of the *Psalms*, made in conjunction with Beza, was long used in the Protestant churches in France, though his own life was marked by complete religious indifference. The combination of satirical humour, naïveté, and delicacy exhibited in his works is known as the *Style Marotique*, of which La Fontaine furnishes the best subsequent examples.

Marquessa, a French island-group in the Southern Pacific, north of the Paumotu, and administered by Tahiti. There are thirteen islands; seven are inhabited; Nukahiva and Hiva-ou are the largest. The interiors are hilly, and the coasts rise steeply from the sea. Copra and pearl-shell are the chief products. The Marquesas were discovered partly by Medaña (1595) and partly by Ingraham (1701), who named them the Washington Islands. They were annexed to France in 1842. Total area, 480 sq. miles; pop. 3424.

Marquess, or **Marquis** (Fr. *marquis*; It. *marchese*; Ger. *markgraf*), a title of honour next in dignity to that of duke, first given to those who commanded on the marches or frontiers of countries. The title was first introduced into England by King Richard II in the year 1387, but fell into disuse until the reign of Edward VI, who created the Marquessate of Winchester in 1551.

Marquetry (Fr. *marqueterie*), inlaid cabinet-work in which thin slices of different-coloured wood, sometimes of ivory, pearl, shell, or metal, are inlaid on a ground usually of oak or fir, well seasoned to prevent warping. At one time figures and landscapes were represented by means of marquetry, but it is now chiefly disposed in regular geometrical figures.

Marriage is necessarily the basis of social

organization. Whether or not the original practice among mankind was sexual promiscuity or a monogamous association of a more or less permanent kind is a problem which has been hotly disputed for many years. But, although the evidence for coming to a definite conclusion in this matter is not available, the facts revealed by primitive human societies, as well as comparison with the sexual habits of anthropoid apes, seem to suggest that monogamy may have been the original form of marriage. Decent was originally matrilineal, not merely because of the mother's function of feeding and controlling her children, but also because the facts of paternity were not appreciated until a relatively recent period in man's history, when he acquired the physiological knowledge of his share in the production of offspring. Until this fact was demonstrated women were regarded as the obvious parents, and all decent was reckoned matrilineally.

Whether originally marriage was monogamous or not, the peculiarities in the usage of family names among primitive peoples suggest that a condition of sexual communism was a very early and widespread custom. In accordance with this system sexual relations were regarded as orthodox and proper between all the men of one social group and all the women of another social group, without any particular woman being regarded as the wife of a given man. Perhaps as an outcome of this system a widespread practice grew up of regarding it as improper for a man to take to wife any woman of his own clan or social group; he had to obtain a wife from another group, to which in many cases he transferred his allegiance and that of his children. This practice is known as *exogamy*. In communities where such marriage customs prevail it is often regarded as incestuous, and as such strictly tabooed, to marry within one's clan. But among other peoples the orthodox form of marriage is *endogamous*, i.e. within the clan. Many varied forms of marriage custom are found among different peoples: *polygamy*, or plurality of wives; *polyandry*, where a woman has several husbands, usually brothers, at the same time; and *cross-cousin marriage*, where the orthodox union is for a man to marry the daughter of his mother's brother or of his father's sister, being some of the most widely recognized varieties. In some regions marriages are regarded as proper which in other places are regarded as incestuous and most strictly forbidden. Not only so, but in some places it was considered imperative for kings to enter into alliances, say, with their own sisters or daughters, which were forbidden to other members of the community. The most diverse views are held by different peoples respecting chastity in a

bride before marriage. Among some peoples, like the Arabs, lack of the evidence of virginity at marriage is a sufficient ground for nullification. Other people regard sexual gratification on the part of unmarried girls not merely as a natural procedure, but even as a necessary preliminary to marriage. For an account of the intimate relationship of these varied forms of marriage to sociology, see W. H. R. Rivers, *Kinship and Social Organization* (1914); for an encyclopædic discourse on the manifold aspects of the subject, see E. Westermarck, *The History of Marriage* (1921).

Marriage Laws. Marriage is the 'voluntary union for life of one man and one woman to the exclusion of all others'. As a rule such union to be valid must be entered into according to the law of the place where it is contracted, and, generally, a marriage contracted in a foreign country in accordance with the forms prevailing there is valid in England if it does not contravene English law. Marriage is a contract, and with some special exceptions the rules applicable to contract apply. But it cannot be entered into or dissolved at pleasure, and during its subsistence the personal rights and duties of the spouses are regulated by law.

By English law a marriage cannot be contracted by a male under fourteen years or a female under twelve, and until majority the consent of parent or guardian is required. (Contrast Scots law, under which a minor (q.v.) may marry without such consent, and French law, under which the parents' consent is necessary though the parties are of full age.) Neither party must be bound by a subsisting legal marriage, be physically incapable of consummating the marriage, or be insane, but a marriage entered into during a lucid interval is not invalid. Lastly, the parties must not be within the prohibited relationships, namely, ascendants and descendants *ad infinitum*, brothers and sisters, and collaterals where one stands *in loco parentis* to the other (e.g. uncle and niece), half-blood relationships, and the corresponding relationships by affinity (excepting, by recent enactments, the case of marriage with a deceased wife's sister or a deceased husband's brother) being prohibited equally with the full-blood. A marriage may be invalidated by duress or fraud, but, generally, not by misrepresentation as to character, circumstances, or position. Specific performance of a promise of marriage will not be ordered by the court, but damages may be awarded for the breach.

Certain preliminary procedure is required by law before a marriage can take place: (1) publication of banns for three successive Sundays at divine service in the parish (or in each of the two parishes) in which the parties have resided

for the preceding fifteen days, the marriage taking place in church within three months of the last publication; or (2) notice to the superintendent registrar of the district in which each party has resided for the preceding seven days, a certificate being issued twenty-one days later and the marriage taking place in church (with consent of the clergyman) or dissenting place of worship or registrar's office within three months; or (3) issue of an ordinary bishop's licence after application by one party, who must have resided in the parish for fifteen days, the marriage taking place in church within three months; or (4) issue of a special licence by the Archbishop of Canterbury, no previous residence being necessary, and the marriage being celebrated at any time and place; or (5) issue of a licence by the superintendent registrar after twenty-four hours' notice, the applicant having fifteen days' residence in the district and the marriage taking place in a dissenting place of worship or registrar's office.

In Scotland a marriage may be 'regular' or 'irregular'. A regular marriage is one celebrated by a clergyman before two witnesses after proclamation of banns or notice to the registrar. Fifteen days' residence of at least one party when the procedure is by proclamation of banns, and of both parties when it is by notice, is necessary. An irregular marriage, constituted by present interchange of consent, by promise *subsequente copula*, or by cohabitation with habit and repute of marriage, without any ceremony, is equally binding, but the first-mentioned form requires at least twenty-one days' previous residence of one of the parties.

In the United States and Canada a licence is necessary as a rule, and the marriage must take place before a minister of religion or (in United States) a magistrate. See *Divorce; Husband and Wife; Judicial Separation; &c.*

Mar'ryat, Frederick, English novelist and naval officer, born 1792, died at Langham, Norfolk, 1848. In 1808 he entered the navy as midshipman on board the *Imperieuse*, commanded by Cochrane, afterwards Lord Dundonald, and, having served with distinction and attained the rank of captain, he retired in 1830. His first attempt in literature was made in 1829, by the publication of *Frank Mildmay*. Its success led to an extensive series of works of the like kind, including: *The King's Own*, *Peter Simple*, *Jacob Faithful*, *Japhet in Search of a Father*, *Newton Forster*, *Midshipman Easy*, *The Pacha of Many Tales*, *The Poacher*, *The Phantom Ship*, *Snarley-Yow or the Dog Fiend*, *Percival Keene*, *Masterman Ready*, *Poor Jack*, and others. He was also the author of a *Code of Signals for the Merchant Service* (1837). Captain Marryat's novels are remarkable for broad humour and fidelity of

description as regards sea-life, but he cannot be said to be a great master of plot.

Mars, the Roman god of war, at an early period identified with the Greek *Arès*, a deity of similar attributes. Like Jupiter he was designated *father*, and was regarded in particular as the father of the Roman people, Romulus and Remus being the fruit of his intercourse with Rhea Sylvia. Several temples at Rome were dedicated to him. His services were celebrated not only by particular *flamines* devoted to him, but by the College of the Salii, or priests of Mars. The month of March, the first month of the Roman year, was sacred to him. As the tutelary deity of Rome he was called *Quirinus*, in his character as the god of war *Gradivus* (the striding). *Arès*, the Greek god of war, was the son of Zeus (Jupiter) and Hera (Juno). He is represented as terrible in battle, but not as invulnerable, since he was wounded at various times by Heracles, Diomedes, and Athena. He is represented as a youthful warrior of strong frame, either naked or clothed with the chlamys. The chief seats of the worship of *Arès* were in Thrace and Seythia.

Mars, of the superior planets that which lies nearest the sun, or next beyond the orbit of the earth. It moves round the sun in 686.95 of our mean solar days, at the average distance of 141,500,000 miles, its greatest and least distances being 154,700,000 and 128,300,000 miles; its orbit is inclined to the ecliptic at an angle of $1^{\circ} 51' 5''$; its distance from the earth varies from about 35,000,000 to 244,000,000 miles; it rotates on its axis in 24 hours 37 minutes 22 seconds; the inclination of its axis, or the angle between its equator and its orbit, is 23° ; its diameter is about 4200 miles. Mars shines with a reddish light, due to the fact that most of its surface has an ochre hue, and doubtless is in an arid condition resembling our deserts. Considerable portions, however, have a bluish-green colour, and vary decidedly in tint with the seasons. There seems much reason to suppose that such changes are caused, in part at least, by recurrent growth and decay of vegetation. The polar regions exhibit white caps, probably of snow, which melt in the summer season of the respective hemispheres, and extend in the winter. At times snowfalls appear to occur suddenly over vast areas. Lines seen traversing the surface have been termed *canals*, and by some authorities have been supposed to be the work of intelligent beings, and designed to irrigate the planet's surface by tapping the polar snows. The inferring of such artificial origin is, however, mere conjecture. In 1877 two satellites, both very small bodies, were discovered by Professor Hall of the Naval Observatory, Washington. The outer one, 14,500 miles distant

from the centre of Mars, revolves round the planet in a period of 30 hours 18 minutes; the inner one, 5800 miles from the centre of Mars, has a period of 7 hours 39 minutes.

Marsala (ancient Lilybæum), a seaport of Trapani, Sicily. The name is of Saracenic origin, i.e. *Marsa-Ali*, the harbour of Ali. Marsala is the centre of the wine-growing district which produces Marsala, a light-coloured wine of the sherry type. Garibaldi landed at Marsala 11th May, 1860, and inaugurated the campaign that liberated Sicily from the Bourbons. Pop. 65,000.

Marseillaise Hymn (mâr-se-lâz'), the war-song of the French Republic. The words and, as is generally believed, the music were written in 1792 by Rouget de Lisle, an officer in garrison at Strasbourg, on the occasion of a body of volunteers leaving that city for the war against Austria and Prussia, and the poem was entitled by him *Chant de guerre de l'armée du Rhin* (War-song of the Army of the Rhine). It was called Marseillaise because first sung in Paris by volunteers from Marseilles. The song was suppressed under the First Empire and the Bourbons, but the Revolution of 1830 called it up anew, and, after being suppressed under the Second Empire, it is now again the recognized national hymn of France.

Marseilles (ancient Massilia), second city and chief seaport of France, capital of the department of Bouches-du-Rhône. It stands on the Bay of Marseilles (Gulf of Lions), and lies in the form of an amphitheatre round a natural harbourage known as the Old Harbour. The principal thoroughfare, la Cannetière, is considered one of the finest in Europe. Although of ancient foundation, the town is comparatively modern, and includes no buildings of genuine antiquity or architectural rarity. Soap, soda and chemical products, oils, sugar, machinery, candles, glass, and earthenware are manufactured, and there is a large transit trade in soap, oil, hides, grain, tobacco, wool, iron, and cotton. The port was entered and cleared by 4,400,000 and 2,420,000 tons respectively in 1919. It comprises a series of docks extending along the shore and protected by a mole, and is strongly fortified. Sheltered by the Île Ratonneau is the Château d'If, immortalized by Dumas in *Monte-Cristo*. Pop. (1911), 550,610.

Marseilles was founded by Phœcean colonists (900 B.C.), who called it Massilia. It espoused the cause of Pompey, and was taken by Cæsar (49 B.C.). On the decline of the Roman Empire the town fell successively to the Goths, Burgundians, and Franks, was sacked by the Saracens in A.D. 735, and, having been taken by Charles of Anjou in 1256, it was united to France (with Provence) in 1481. All its ancient privileges were abolished by Louis XIV (1669). During the

European War (1914-8) Marseilles was the principal centre of Mediterranean communications, forming a convenient base for Indian troops in France and for Allied troops in the Near East.

Marshal (Fr. *Maréchal*), a word of German origin signifying originally a man appointed to take care of horses. A similar term is the French *comptable* or constable, from Latin *comes stabuli* (count or master of the stable). He had to superintend the ceremonies at the coronation of the emperor, and on other high occasions. Until the Revolution of 1918 there was a marshal at the head of the households of German sovereigns. In France *maréchal de France* is the highest military honour. In Germany *general-field-marshal* is the highest military honour. In Great Britain *field-marshal* is the highest military rank. The *air-marshal* is an officer of the Royal Air Force, and the third in rank in the service. The post was created in Aug., 1919, and is equivalent to the rank of vice-admiral in the navy and lieutenant-general in the army. Another English title is *earl-marshal*. (See *Field-marshal*, *Earl-marshal*.) Marshal also signifies a person who regulates the ceremonies on certain solemn celebrations. In the United States a marshal is an executive officer (resembling the sheriff) connected with the United States courts.

Marshall Islands, a Pacific archipelago, in Micronesia, comprising two chains of lagoon islands—Ratak (13 islands) on the east, and Ralik (11 islands) on the west. There are plantations of coco-palm; phosphates and copra are exported. The Marshall group belonged to Germany from 1885 until it was occupied by an Australian force, 12th Sept., 1914. It is administered by Japan under a League of Nations mandate dated 17th Dec., 1920. Jaluit is the administrative centre and chief island. Majeru (pop. 2600) is the most populous. Pop. 9008, of which 102 are Japanese and 5 Europeans.

Marsh-harrier (*Circus aruginosus*), a nearly exterminated British bird of prey about 2 feet in length, frequenting marshes, and living on water-birds, mice, rats, water-rats, frogs, and fish. It is sometimes called the *Moor-buzzard*.

Marsh-mallow (*Althæa officinalis*), a common European plant, growing in marshes, especially near the sea, in great abundance. It is perennial, and has a white, fleshy, carrot-shaped root, which may be used as food. The stem is from 2 to 3 feet high, both leaves and stem being covered with a soft down. The flowers are flesh-coloured. The hollyhock (*A. rosea*) is another species.

Marsh-marigold (*Calitha palustris*), a plant of the nat. ord. Ranunculaceæ, a common British plant found in meadows and by the sides of wet ditches. It has kidney-shaped, shining leaves,

and large, yellow flowers, and like the other plants of the same order it is bitter to taste.

***Marsh-samphire**, a leafless, much-branched, jointed, succulent plant, *Salicornia herbacea*, found on muddy or moist sandy shores, and frequent in England and Ireland. It is eaten by cattle, and makes a good pickle. It is also named *Glazewort* and *Saltwort*.

Marsiliaceæ, a family of Water-ferns or Hydropteridæ (q.v.), allied to Schizaceæ. The only genera are *Marsilia* and *Pilularia*. Both have thin creeping stems, but whereas *Pilularia* (Pillwort) has quill-shaped leaves, those of *Marsilia* resemble a four-leaved clover. The sporangia (of two kinds) are enclosed in roundish pod-like structures (sporangia).

Marsipobranchii (Gr. *marsipos*, a pouch, and *branchia*, gills), the group of vertebrates comprising the hag-fishes and lampreys, with pouch-like gills. The organization of these animals is of a very low grade, as indicated chiefly by the persistent notochord, the absence of any traces of limbs, the absence of a mandible and of ribs, and the structure of the gills.

Marston, John, English dramatist and satirist, was born in 1575 or 1576, and died in 1634. His father was a lecturer of the Middle Temple, and his mother was the daughter of an Italian physician. Marston's Italian blood explains some of the peculiarities of his temperament; for, although he does not completely illustrate the proverb "Inglese Italianato è un diavolo incarnato", his youth was a wild and unbridled one. He was educated at Brasenose College, Oxford, where he graduated B.A. in 1594. He began his literary career as a satirist, and then took to the composition of plays. He did not write anything for the stage after 1607, and at some unknown date, probably about 1608 or 1609, he took holy orders. In 1616 he was presented to the living of Christchurch, in Hampshire, which he resigned in 1631. His works were published in 1633, and he died in the following year. *The Metamorphosis of Pygmalion's Image*, a satire, appeared in 1598. Archbishop Whitgift ordered it to be burnt. Another satire, *The Scourge of Villany*, appeared in the same year. *Antonio and Mellida*, an ill-constructed and bombastic tragedy in two parts, was published in 1602. *The Malcontent*, a better but far from perfect play, appeared in 1604. It was dedicated to Ben Jonson, and was probably intended as a peace-offering after one of the many quarrels between the two dramatists. *The Dutch Courtesan* (1605) is a coarse but lively play. *Eastward Ho* (1605), in which Jonson and Chapman collaborated, is a splendid play, and contains one of the best pictures of city life in all Elizabethan drama. Marston's exact share in it is unknown and unknowable. It nearly got its authors into

serious trouble (see *Jonson*). *Parasitaster, or the Fawn* (1606) is a good comedy; *Sophonisba* (1606), a tragedy on the theme immortalized by Jenny Thomson in 1790, is a feeble and melodramatic play. *What You Will* (1607) borrowed its title from the sub-title of *Twelfth Night*. Other plays in which Marston had a share are: *The Insatiate Countess* (probably in part the work of William Barksstead), *Jack Drum's Entertainment*, and *Histrionautia*.

Marston can hardly be classed among the greater Elizabethan dramatists. He had, without doubt, very great abilities, but he did not make the most of them. Fustian language and uncertainty of taste mar much of his work, though now and again short passages and single lines occur that completely disarm the most querulous critic. Marston had no high opinion of his own work, and said of it: "He that thinks worse of my rhymes than myself, I scorn him, for he cannot; he that thinks better is a fool". He dedicated his early satires "To everlasting oblivion", and "To his most esteemed and best beloved Selfe". In leaving the stage for the pulpit he showed that the days of his youth were over, and that his true bent did not lie in dramatic composition.—**BIBLIOGRAPHY**: J. H. Prynne, *The War of the Theatres*; R. A. Small, *The Stage-Quarrel between Ben Jonson and the so-called Poetasters*; A. C. Swinburne, *The Age of Shakespeare*.

Marston, Philip Bourke, English poet, son of Westland Marston, born in London 1850, died 1887. He became blind in his fourth year, and to this the introspective and morbid character of much of his work must be attributed. His poems were collected at various times in the volumes entitled *Song-tide* (1870), *All in All* (1875), and *Wind Voices* (1883).

Marston Moor, in Yorkshire, near York, a locality celebrated for the battle between the Royalists under Prince Rupert and the troops of the Parliament under Fairfax and Cromwell (2nd July, 1644), in which the latter were victorious.

Marsupialia, or **Marsupials** (Lat. *marsupium*, a pouch), an extensive order of mammals distinguished by the possession of a pouch, in which the teats are situated, and which serves as a shelter for the young, these being born in a very imperfect state. The order is intermediate between the primitive egg-laying mammals (Prototheria or Monotremata) and the higher forms (Eutheria), which include the great majority of the class. The opossums and opossum-rat (*Caenolestes*) are American, but all other living marsupials are native to the Australian region, where, in the absence of competition, they have evolved along many different lines, occupying places in the economy of nature elsewhere

filled by members of the higher orders. There are two sub-orders, divided into various families as follows. Sub-order I—Polyprotodontia, chiefly flesh- or insect-eating species: (1) Dasyuridae, the dasyures; (2) Didelphyidae, the opossums; (3) Peramelidae, the bandicoots; (4) Notoryctidae, the pouched mole. Sub-order II—Diprotodontia, herbivorous species: (1) Macropodidae, kangaroos and wallabies; (2) Phalangeridae, the phalangers; (3) Epanorthidae, opossum rats of Colombia and Ecuador.—BIBLIOGRAPHY: F. G. Aflalo, *Natural History of Australia*; Oldfield Thomas, *British Museum Catalogue of Marsupialia*; F. E. Beddard, *Mammals (in The Cambridge Natural History)*.

Martaban, Gulf of, a Burmese arm of the Bay of Bengal. The city of Martaban was for centuries the capital of the Kingdom of Pegu. It is now a small town, and was taken by the British in 1824 and 1852.

Marten, the name of several carnivorous mammals of the genus *Mustela*, family Mustelidae (weasels). The body of the marten, like that of the weasel, is elongated and slender. The legs are short, the feet being provided with



Beech-marten (*Mustela foina*)

five toes, armed with sharp claws. In habit the martens differ from the weasels in being arboreal, these forms climbing trees with great ease. The pine-marten (*M. abietum*), which has a wide range in the northern hemisphere, is the only species indigenous to Britain. The beech-marten (*M. foina*) is closely related to this. Martens feed on the smaller wild animals, such as rats, mice, &c., but also attack birds and devour eggs. The pine-marten possesses a yellowish

mark on the throat, and its fur is largely used for trimmings. It burrows in the ground. The famous sable marten (*M. zibellina*), which furnishes the valuable sable fur, is nearly allied to the pine-marten. It inhabits Siberia. The American sable is furnished by the *M. americana*; and Pennant's marten (*M. pennanti*), or the fisher, as it is popularly called, is another well-known species.

Martial (Marcus Valerius Martialis), Roman epigrammatist, was born between A.D. 38 and 41, and died about A.D. 102 or 103. His home was at Augusta Bilbilis, in Spain, and he became acquainted with his fellow-countrymen Seneca and Lucan. They were more or less his patrons, and he followed them to Rome in the year A.D. 64. In the following year Lucan and Seneca were implicated in the conspiracy of the Pisos, and compelled to commit suicide. Martial was left to his own devices, and for almost thirty-five years he followed the precarious career of a man of letters at Rome. He relied for his livelihood mainly upon his high-born patrons, though when his reputation was established he had a certain income from booksellers. He had first a flat and then a house in Rome, and a small country house at Nomentum. He returned to his native town in A.D. 98, and soon after was presented with a small estate by a lady named Marcella, thus securing independence for his declining years. In Rome he had cherished a theoretical love for the country, but at Bilbilis he felt a keen regret for the bustle and pleasures of the capital.

Martial's works consist of fifteen books of epigrams. The earliest of his extant works is usually incorrectly called *Liber spectaculorum*, and is a collection of epigrams upon the shows provided by Titus and Domitian, especially those given in the Colosseum. This book was published in A.D. 81. The two books of epigrams called *Xenia* and *Apophoreta*, and numbered xiii and xiv by editors, were published at Christmas A.D. 84. All the epigrams in these books are distichs intended to accompany Christmas presents. They have no more literary value than modern cracker-mottos have. Martial's reputation rests upon his twelve books of miscellaneous epigrams, the first of which was published in A.D. 80, and the last of which was sent from Spain to Rome, and published soon before Martial's death. These twelve books contain over eleven hundred epigrams.

There are some features in Martial that are repellent to modern readers. Some of his epigrams are outrageously indecent. They are, however, gross rather than purulent, Rabelais rather than Ovid. About seven-eighths of his work is free from this fault, which may be due to a literary convention as much as to any

depravity in Martial. What offends some readers almost more is Martial's gross flattery of Domitian. This can also be forgiven if we judge Martial by the standards of his time. Customs have changed, but not so long ago. Some of Ben Jonson's epigrams and the Dedication of the Authorized Version of the Bible are just as offensive as Martial in this respect. It is more profitable to consider Martial's good points. He was a good friend and companion, and was fond of children. He had a real gift for occasional verse, and in some of his epigrams he has managed to write charming poems. He has drawn a splendid picture of Rome during a reign of terror. He has given the reverse of Juvenal's picture, and shown that there was a Rome where the comedy of life could still be played. R. L. Stevenson has well said of him: "Martial is a poet of no good repute, and it gives a man new thoughts to read his works dispassionately, and find in this unseemly jester's serious passages the image of a kind, wise, and self-respecting gentleman. It is customary, I suppose, in reading Martial, to leave out these pleasant verses; I never heard of them, at least, until I found them for myself; and this partiality is one among a thousand things that help to build up our distorted and hysterical conception of the great Roman Empire" (*Books which have influenced me*).—BIBLIOGRAPHY: W. M. Lindsay, *The Ancient Editions of Martial*; R. T. Bridge and E. D. C. Lake, *Select Epigrams of Martial*; L. Friedländer, *Sittengeschichte Roms*.

Martial Law. This must not be confused with military law (q.v.), being, as it is, of an entirely different nature. The term may commonly be used in two senses: (a) the method of governing an occupied enemy country by the will of the conqueror, known to English practice as military government; (b) the government (total or partial) of any portion of the Home Country or Dependencies by armed force in times of expected invasion, riot, or insurrection. In case (a) the right to govern an occupied country is passed to the conqueror by the laws of war, and his officer may, in order to preserve tranquility and to protect his troops, give such orders as he may consider necessary, that is, he may abolish the native courts entirely, or he may curtail or increase their powers. In case (b) there are two varieties differing somewhat the one from the other. According to the strictest and most accurate interpretation of the term, it means the entire suspension of the ordinary law of the land and its supersession by military government; in such a sense martial law could be put in force only by an Act of Parliament. In the second and more usual variety the power of invoking martial law is based on the common-law right of every Govern-

ment to meet force by force. This power will probably be taken by Government by means of a 'proclamation', which is merely a statement on the part of the Government of its intention to avail itself of its legally constituted forces to assist the civil power in keeping the peace in case of riot or insurrection, or of enforcing military precautions in case of invasion. In either case no greater area of country than is necessary will be placed under martial law, and the boundaries of such an area will be defined in the proclamation; further, all reasonable acts done by officers and soldiers in carrying out their duties will be covered by a subsequent 'Act of Indemnity'.

Martin a name applied to several birds belonging to the swallow family. The one best known is the *Chelidon urbica*, or house-martin, a familiar British bird, which builds a rounded mud-nest under the eaves of houses, or in the upper angles of windows. In habits it resembles the chimney-swallow, but its tail is less markedly forked and the throat is white, while its nest also differs, that of the chimney-swallow being cup-shaped. The lighter-backed sand-martin (*Cotile riparia*) excavates a burrow in the face of a cliff or bank, and makes a loose nest of grass and feathers. See *Swallow*.

Martin, St., or St. Martin of Tours, was born of heathen parents in Pannonia about the year A.D. 316. He served under Constantius and Julian, and went to Gaul. Among other virtuous and benevolent acts, he divided his cloak with a poor man whom he met at the gates of Amiens (Ambianum). The legend says that Christ appeared to him in the following night covered with the half of this cloak. Soon after this vision Martin was baptized, in 337. After living many years in retirement he visited his native place, and converted his mother. About the year 375 he was chosen against his will Bishop of Tours. In order to withdraw himself from the world he built the famous convent of Marmoutiers, and is said to have died about the year 400. He was the first saint to whom the Roman Church offered public adoration. His festival takes place on the 11th of November.—Cf. J. G. Casenove, *St. Hilary of Poitiers and St. Martin of Tours*.

Martin, St., one of the Leeward Islands, lying close to Anguilla, and divided between France and Holland, the inhabitants speaking English. The Dutch (south) portion has an area of 17 sq. miles; pop. (1920), 2552. It is included in the colony of Curaçao (q.v.). The French (north) portion is a dependency of Guadeloupe (q.v.).

Martineau (már'ti-nô), Harriet, English authoress, of French Huguenot descent, born at Norwich 1802, died at Ambleside 1876.

Her works include: *Deerbrook; The Hour and the Man; Eastern Life, Past and Present*; and a *History of England during the Thirty Years' Peace*.—Cf. F. F. Miller, *Harriet Martineau*.

Martineau, James, Unitarian minister and philosophical writer, a younger brother of Harriet Martineau, was born at Norwich 1805, died 1900. He was educated at the Norwich Grammar School, Dr. Lant Carpenter's school at Bristol, and Manchester New College, York. After holding ministerial appointments in Dublin and Liverpool, he became in 1841 professor of mental and moral philosophy in Manchester New College. In 1857 he removed to London, and was minister of Little Portland Street Chapel from 1859 to 1872. From 1869 to 1885 he held the principalship of Manchester New College (which from 1857 had been in London). Among his works are: *The Rationale of Religious Inquiry* (1836), *Endeavour after the Christian Life* (2 vols., 1843-7), *Miscellanies* (1852), *Studies of Christianity* (1858), *Essays Philosophical and Theological* (1868), *Modern Materialism* (1876), *Hours of Thought on Sacred Things* (2 vols., 1876-80), *A Study of Spinoza* (1882), *Types of Ethical Theory* (1885), *A Study of Religion* (2 vols., 1887), &c. —Cf. J. H. Hertz, *The Ethical System of James Martineau*.

Martinique, a French island of the Windward group, West Indies; area, 385 sq. miles. It is of volcanic origin, culminating in Mont Pelée (4500 feet), other volcanic peaks being Pitons de Carbet (3955 feet) and Vauclin (1056 feet). Sugar, rum, and cocoa, with some coffee, tobacco, and cotton, are the chief productions and exports. There are one hundred and twenty-six rum distilleries and fifteen sugar-works on the island. The former commercial capital, St. Pierre, was destroyed by an eruption of Mont Pelée (May, 1902), and Fort-de-France (pop. 26,399) has taken its place. There is a law school at Fort-de-France and a lycée for boys. Pop. (1916), 193,087.

Martinique was the birth-place of Joséphine, and the home for a time of Mme de Maintenon. It was discovered by Spaniards on St. Martin's Day (1493), being then peopled by Caribs. In 1635 it was settled by the French, who exterminated the Caribs. It was twice taken and held by the British (1794-1802, 1809-14). The present Government comprises a Governor, a General Council, and elective municipal councils, and the colony is represented in Paris by a Senator and two Deputies.—Cf. H. Monet, *La Martinique*.

Martos (ancient Colonia Augusta Gemella), a town of Jaen province, Andalusia, Spain, with a trade in grain, oil, and wine. It was taken from the Moors by Ferdinand III (1225). Pop. 17,000.

Martyrs (Gr. for 'witnesses'), a name ap-

plied by the Christian Church to those persons in particular who, in the early ages of Christianity and during the great persecutions, suffered ignominy and death rather than renounce their faith. Festivals in honour of the martyrs seem to have been observed as early as the second century. The Christians offered prayers at the tombs of the martyrs, and thanked God for the example which they had given to the world. The rite was concluded with the sacrament of the Lord's Supper and the distribution of alms. Eulogies were also delivered, and accounts of the lives and actions of the deceased read.

Mar'vell, Andrew, a political and miscellaneous writer, born at Hull in 1621, died in London 1678. In 1633 he went to Trinity College, Cambridge. After travelling for four years on the Continent, he was appointed assistant to Milton in his office of Latin secretary. In 1660 he was chosen member of Parliament for his native place, which he represented to the end of his life. Besides a small handful of finely musical poems, he composed much humorous and satirical verse, and was the writer of several political pamphlets.

Marx, Karl Heinrich, German economist and founder of a school of Socialism, born at Trèves (Trier) 1818, died in London 1883. He studied history and philosophy at the Universities of Bonn and Berlin. After living at Cologne and Paris, in 1845 he proceeded to Brussels, where he wrote his *Misère de la Philosophie*. In 1847 he drew up, in conjunction with Engels, whose acquaintance he had made in Paris, the famous *Communist Manifesto*, a document which embodies the creeds of the Socialist-revolutionaries. He took part in the Revolution of 1848 in the Rhine country, and in 1849 he settled permanently in London. In 1864 he was at last able to realize his plan of organizing the working-men of the civilized world, and on 28th Sept., at a meeting in St. Martin's Hall, he outlined his scheme and founded the International Working-Men's Association. The first volume of his great work *Das Kapital* appeared in 1867; the second volume was completed by Engels and published in 1885; and the third volume appeared in 1895. As an economist, Marx carefully analysed the 'theory of value', and the nature of capitalistic production. The measure of the value of an article is, according to Marx, the amount of labour necessary to produce it. The labourers, however, produce more than they consume, but under the capitalistic régime they lose the surplus value, i.e. of what they produce over and above their wages. The capitalist is therefore the enemy of the labourer, and it is in the latter's interest to emancipate himself from the régime of the former. Marx thus preached class-war.

He also traced the growth of the working-classes, or the proletariat, and maintained that "the emancipation of the working-classes must be accomplished through the working-classes themselves". That there is no room for individual liberty in a society organized according to Marx's doctrines is evident enough. One has only to look at Russia, where Bolshevism and the 'dictatorship of the proletariat' are based upon and governed by Marxian principles.—BIBLIOGRAPHY: B. Croce, *Historical Materialism and the Economics of Marx*; J. Spargo, *Karl Marx: his Life and Doctrine*; E. B. Aveling, *The Student's Marx*.

Mary, The Virgin, the mother of Jesus, according to tradition embodied in the apocryphal gospels the daughter of Joachim and Anna (cf. *Luke*, ii, 36). The story of her life so far as it is given in the New Testament begins with her betrothal to Joseph (*Luke* i), and the narrative of the birth of Christ. She is thrice mentioned during Christ's public ministry (*John*, ii; *Matt*, xii, 47; *John*, xix, 25-27), and once after his death (*Acts*, i, 14). A tradition asserts that she lived and died at Jerusalem under the care of John; another that she died at Ephesus, to which she and John had retired from the siege of Jerusalem. A later tradition asserts that on her grave being opened three days after her burial only the grave-clothes were found in it. The devotion or adoration paid by Roman Catholics and others to the Virgin Mary is condemned by Protestants in general, who stigmatize it as *Mariolatry*. The title of Mary to adoration did not become a tenet in the orthodox Latin Church till the sixth century, when the Christian Church began to celebrate festivals in her honour, of which the Purification, the Annunciation, and the Visitation (the visit of Mary to Elizabeth) are still retained in Protestant countries. The Greek and Roman Catholics, and the schismatic Churches in the East, observe several feasts besides the above in honour of the Virgin; for instance the birth of Mary, and her death and reception into heaven (by the Roman Catholics called the *Assumption*). The festival of the Immaculate Conception is celebrated only by the Roman Catholic Church.—Cf. J. S. Northcote, *Mary in the Gospels*.

Mary I, Queen of England, daughter of Henry VIII by Catherine of Aragon, born in 1516, died 1558. After her mother's death she was declared illegitimate, but was restored to her rights when the succession was finally settled in 1544. She was brought up by her mother in the Roman Catholic faith, on which account she was treated with rigour under Edward VI. She ascended the throne in 1558, after an abortive attempt to set her aside in favour of Lady Jane Grey. One of her first measures was the rein-

statement of the Roman Catholic prelates who had been superseded in the late reign. Her marriage to Philip II of Spain, united as it was with a complete restoration of the Catholic worship, produced much discontent. Insurrections broke out under Cave in Devonshire, and Wyatt in Kent, which, although suppressed, furnished sufficient excuses for the imprisonment of the Princess Elizabeth in the Tower, and the execution of Lady Jane Grey and her husband, Lord Guildford Dudley. England was now formally declared to be reconciled to the Pope; the sanguinary laws against heretics were revived, and nearly 300 perished at the stake, including Crammer, Latimer, and Ridley. Under Philip's influence a war began with France, which ended in the loss of Calais in 1558, after it had been held by England for above 200 years. This disgrace told acutely upon Mary's disordered health, and she died shortly afterwards.—Cf. J. M. Stone, *The History of Mary I, Queen of England*.

Mary II, Queen of England, born in 1662, died 1694. She was the elder daughter of James, Duke of York, afterwards James II, by his wife Anne Hyde, daughter of Lord Clarendon. Married in 1677 to William, Prince of Orange, when the Revolution dethroned her father, she was declared joint-potestator of the throne with William, on whom all the administration of the government devolved. During the absence of William in Ireland in 1690, and during his various visits to the Continent, Mary managed at home with extreme prudence. She was strongly attached to the Protestant religion and the Church of England. See *William III*.

Mary, Queen Consort of King George V, born at Kensington Palace 26th May, 1867, daughter of the Duke of Teck. Queen Mary's baptismal names were Victoria Mary Augusta Louisa Olga Pauline Claudine Agnes. On the death of the Duke of Clarence (14th Jan., 1892), to whom she was betrothed, she became engaged to (3rd May, 1893), and married his brother, the Duke of York, second son of King Edward VII (6th July, 1893). The Duke of York, created Prince of Wales in 1901, ascended the throne with his consort on 6th May, 1910.

Maryland, a maritime state of the United States, one of the thirteen original states. It lies around Chesapeake Bay, occupying part of the peninsula formed by the Chesapeake and Delaware Bays, and extending inland to West Virginia, bounded on the south by the Potomac and on the north by Pennsylvania. It has about 35 miles of seaboard on the Atlantic, the bulk of the natural Atlantic coast-line being occupied by Delaware in the north and by a detached portion of Virginia in the south. Maryland is divided into twenty-three counties and Balti-

more City. Baltimore is the principal seaport and commercial centre, but Annapolis is the capital. Agriculture is the principal industry, and wheat the main crop, but maize, potatoes, vegetables, fruit, and tobacco are also raised. Dairying and sheep-farming are extensive. Coal and clay are worked, and some slate is quarried. The oyster fisheries are the most important in the United States. Maryland is the eighth state in manufacturing importance; first in canning and in fertilizer manufacture, eighth in tobacco production, second in iron and shipbuilding, and third in clothing manufactures. There are two universities and an Agricultural College. State area, 12,327 sq. miles (2386 water, Chesapeake Bay alone occupying 1203 sq. miles); pop. (1920), 1,440,081.

Maryland was founded (1632) by Leonard Calvert, acting on behalf of Lord Baltimore, his brother, and the name is commemorative of Henrietta Maria, Queen of Charles I. The state is now governed by a General Assembly consisting of a Senate (27 members), and a House of Delegates (102 members). Senators serve for four years, one half being re-elected every two years; delegates are elected for two years. Two Senators and six Representatives are sent to Congress.—(F. W. H. Browne, *Maryland* (American Commonwealth Series).

Marylebone, St., a metropolitan borough of the county of London. It contains the Middlesex Hospital, Philharmonic and Queen's Halls, Lord's cricket ground, and Madame Tussaud's Wax-work; and its area embraces St. John's Wood district, Cavendish and Portman Squares, and Harley Street. Pop. (1921), 104,222.

Maryport, a seaport of Cumberland, England, at the mouth of the Ellen, and on the Solway Firth; served by the Maryport and Carlisle Railway. There are coal and iron mines in the vicinity, for which Maryport is the shipping outlet. The main industries are shipbuilding, saw-milling, and iron-founding. Maryport (formerly Ellenfoot), was so named in 1730 because Mary Queen of Scots landed there in 1568. Pop. (1921), 10,895.

Mary Stuart, Queen of Scots, was born at Linlithgow Palace in 1542, beheaded 8th Feb., 1587. She was the daughter of James V by his queen, Mary of Lorraine, a princess of the family of Guise. Her father dying when she was a few days old, the regency was, after some dispute, vested in the Earl of Arran. In 1558 she was married to the dauphin, afterwards Francis II. He died seventeen months after his accession to the crown, in Dec., 1560, and in Aug., 1561, the widowed queen returned to Scotland. Mary was a Roman Catholic, but when she returned to Scotland she found that the influence of the Presbyterians was paramount in her kingdom.

Though inclined to have Roman Catholicism again set up in Scotland, after a vain attempt to influence Knox she resigned herself to circumstances, quietly allowed her half-brother, the Protestant Earl of Moray, to assume the position of first minister, surrounded herself with a number of other Protestant advisers, and dismissed the greater part of her train of French courtiers. She even gave these ministers her active support in various measures that had the effect of strengthening the Presbyterian party; but she still continued to have the mass performed in her own private chapel at Holyrood. At first her subjects were quiet, she herself was popular, and her court was one of the most brilliant in Europe. The calamities of Mary began with her marriage to her cousin, Lord Darnley (20th July, 1565). Darnley was a Roman Catholic, and immediately after the marriage the Earl of Moray and others of the Protestant lords combined against the new order of things. They were compelled to take refuge in England, and the popularity of Mary began to decline. In addition to this, Darnley proved a weak and worthless profligate, and almost entirely alienated the queen by his complicity in the murder of Rizzio (9th March, 1566), though a reconciliation seemed to be effected between them about the time of the birth of their son, afterwards James VI of Scotland and I of England (10th June, 1566). About the close of the same year, however, Darnley withdrew from the court, and in the meantime the Earl of Bothwell had risen high in the queen's favour. When the young prince James was baptized at Stirling Castle, on the 7th of Dec., 1566, Bothwell did the honours of the occasion, and Darnley, the father of the prince, was not even present. Once more, however, an apparent reconciliation took place between the king and queen. Darnley had fallen ill, and was lying at Glasgow under the care of his father. Mary visited him, and took measures for his removal to Edinburgh, where he was lodged in a house called Kirk-of-Field, close to the city wall. He was there tended by the queen herself; but during the absence of Mary at a masque at Holyrood the house in which Darnley lay was blown up by gunpowder, and he himself was afterwards found dead with marks of violence on his person (9th Feb., 1567). The circumstances attending this crime were very imperfectly investigated, but popular suspicion unequivocally pointed to Bothwell as the ringleader in the outrage, and the queen herself was suspected, suspicion becoming still stronger when she was carried off by Bothwell, with little show of resistance, to his castle of Dunbar, and married to him on the 15th of May. A number of the gables now banded together against Bothwell, who succeeded in collecting a force; but

on Carberry Hill, where the armies met on the 15th June, his army melted away. The queen was forced to surrender herself to her insurgent nobles, Bothwell making his escape to Dunbar, then to the Orkney Islands, and finally to Denmark. The confederates first conveyed the queen to Edinburgh, and thence to Loch Leven Castle, where she was placed in the custody of Lady Douglas, mother of the Earl of Moray. A few days after, on the 20th of June, a casket containing eight letters and some poetry, all said to be in the handwriting of the queen, fell into the hands of the confederates. The letters, which have come down to us only in the form of a translation appended to Buchanan's *Deduction*, clearly show, if they are genuine, that the writer was herself a party to the murder of Darnley. They were held by the confederates to afford unmistakable evidence of the queen's guilt, and on the 24th of July she was forced to sign a document renouncing the crown of Scotland in favour of her infant son, and appointing the Earl of Moray regent during her son's minority. After remaining nearly a year in captivity Mary succeeded in making her escape from Loch Leven (2nd May, 1568), and, assisted by the few friends who still remained attached to her, made an effort for the recovery of her power. Defeated by the Regent's forces at the battle of Langside (13th May, 1568), she fled to England, and wrote to Elizabeth entreating protection and a personal interview; but this the latter refused to grant until Mary should have cleared herself from the charges laid against her by her subjects. For one reason or another Elizabeth never granted Mary an interview, but kept her in more or less close captivity in England, where her life was passed in a succession of intrigues for accomplishing her deliverance. For more than eighteen years she continued to be the prisoner of Elizabeth, and in that time the place of her imprisonment was frequently changed, her final prison being Fotheringhay Castle, Northamptonshire. She was at last accused of being implicated in a plot by one Babington against Elizabeth's life, and having been tried by a court of Elizabeth's appointing, was on the 25th of Oct., 1586, condemned to be executed. There was a long delay before Elizabeth signed the warrant, but this was at last done on the 1st of Feb., 1587. Mary received the news with great serenity, and was beheaded a week later, on 8th Feb., 1587, in the castle of Fotheringhay. Authorities are more agreed as to the attractions, talents, and accomplishments of Mary Stuart than as to her character. Contemporary writers who saw her unite in testifying to the beauty of her person, and the fascination of her manners and address. She was witty in conversation, and ready in dispute. In her trial

for alleged complicity in Babington's plot she held her ground against the ablest statesmen and lawyers of England.—**BIBLIOGRAPHY:** Agnes Strickland, *Life of Mary, Queen of Scots*; T. F. Henderson, *The Casket Letters and Mary, Queen of Scots*; H. G. Bell, *Life of Mary, Queen of Scots*; F. A. Mumby, *Elizabeth and Mary Stuart*; A. S. Hunt, *The Love Affairs of Mary, Queen of Scots*.

Masaccio (mā-săt'chō), properly *Tommaso Guidi*, one of the oldest painters of the Florentine school, said to have been born about 1401, died at Rome about 1428. In the church del Carmine, at Florence, are some excellent paintings of his. Baldinucci and Vasari place Masaccio among the first painters by whom the harshness and difficulty of the art was diminished, and life and expression given to it. His *Madonna and Child* is in the National Gallery, London.

Masai, an African nomad people mainly found in Kenya Colony and Uganda. The region inhabited by them is known as Masai-land.

Maubaté, an island of the Philippine group, south of Luzon, forming, with adjacent islands, the province of Maubaté. The capital is Maubaté. It is largely afforested and produces timber; stock-raising and fishing are the staple industries. Area, 1255 sq. miles; pop. about 45,000.

Mascara, a town of Algeria, on the railway and about 90 miles south-east of Oran. It was a stronghold of Abd-el-Kader, who preached the holy war of 1837. Pop. estimated at 25,000.

Mascarene Islands, the collective name for Réunion, Mauritius, and Rodriguez, so called from the discovery of Réunion (Bourbon, Island) by the Portuguese navigator Mascarenhas (1545).

Masefield, John, British poet and dramatist, born 1875. His early life he spent in constant travelling, as a seaman before the mast and at many trades in the United States, but, on the publication of his *Salt-water Ballads* (1902), *A Main-mast Haul* (1905), and his edition of Dampier's *Voyages* (1906), he settled down to literary work in England. During the European War he served both in France and Gallipoli and published the story of the Dardanelles campaign (*Gallipoli*). *Reynard the Fox* (1919), *Right Royal* (1920), and *Enslaved* (1920), are among his later works.

Mashonaland, the country south of the Zambezi (South Africa), now comprising, with Matabeleland, Southern Rhodesia (q.v.). Salisbury is the chief town.

Mask, a covering for the face, often shaped so as to form a rude representation of the human features. Masks have been in use from the most ancient times. Among the Greeks they were used particularly in the processions and ceremonies attending the worship of Dionysus (Bacchus). As the origin of Grecian tragedy

was closely connected with the worship of Dionysus, masks were used in it even in its early days. The ancient masks usually covered the whole head, and accordingly represented the features, head, hair, and eyes. They had mostly very large open mouths, and seem to have had some effect in strengthening the voice of the speaker, this being required by the immense size of the ancient theatres. The Roman theatre differed little from the Grecian in the use of the mask, which the Italian popular theatre, called 'Commedia dell' Arte', closely resembling the old Roman mime and pantomime, still retains. The mask used at masked balls or masquerades is a covering for the head and face made from a light stuff, a common form being the half-mask covering eyes and nose only.

Maskinongy (*Esox nobilior*), a fine North American freshwater fish of the pike genus, inhabiting the St. Lawrence basin, and twice the size of the common kind.

Mason-bees, a name given to solitary bees of the genus *Chalcidodoma*, which construct their nests with sand or gravel, agglutinated together by means of a viscid saliva, and fix them on the side of walls.

Mason-spider ('Centza), a spider more commonly known as a 'Trap-door Spider' (q.v.).

Mason-wasp, a name given to certain solitary wasps, especially species of *Eumenes* and *Odynerus*, the former making curved clay-nests, and the latter burrowing in sand.

Maso'ra, or **Masso'rah**, a Hebrew word signifying 'tradition', the name of a collection of notes referring to the Hebrew text of the Old Testament, and written in Chaldee chiefly on the margin of Hebrew MSS. These notes are various in their character, critical, grammatical, and explanatory, and include an indication of the vowel-points and accentuation of the Hebrew text according to the Jewish tradition. At what time the accumulation of these notes was commenced cannot be ascertained. According to some Jewish writers they were begun in the time of Ezra. A large part of them were compiled in the Jewish schools of Tiberias subsequent to the third century, and the collection was not completed till the eighth century at the earliest. —(C. C. D. Ginsburg, *The Massorah*).

Masque, a form of entertainment popular at court and among the nobility in England during the reigns of Elizabeth, James I, and Charles I. The history of the English masque is inseparably connected with the name of Ben Jonson, who wrote about half of all the extant masques. The pre-Jonsonian masque was spectacular and of no literary importance. Typical specimens will be found in *Timon of Athens*, i, 2, and in Henry VIII, i, 4. Jonson's earliest masques

were embedded in *Cynthia's Revels* (1600), and followed the old tradition. His first court masque was *The Masque of Blackness* (1605), other notable ones being *The Masque of Queens* (1609), *Love Restored* (1612), *News from the New World discovered in the Moon* (1621), and the last of his masques, *Chloridia* (1631). Other famous writers of masques were Fletcher (none of whose masques has been preserved), Beaumont, Campion, Daniel, and Davenant, who wrote the last of all the masques, *Salmacida Spolia* (1640). The Civil War put an end to the masque, as it did to many of the amenities of life in England.

The masque has sometimes been defined as a kind of miniature drama, but it is not a drama and is not subject to the laws of dramatic criticism. It always had for its central feature a dance or series of dances. The dancing-master, who was paid £50 for his services, was more important than the librettist or even the designer of scenery, who were paid £40 a-piece. The masquers were eight, twelve, or sixteen in number. They were noble lords and ladies as a rule, the king and queen sometimes taking part themselves. Their sole duty was to look imposing and to dance; they did not speak or sing. Their costumes were elaborate and costly, and they represented mythological or heroic characters. Every masque was accompanied by a torch-bearer. The masquers danced the following dances, first the Entry or Descent, then the Main Dance; then they chose partners from among the audience and danced the Revels, quick lively dances performed without rehearsal. Finally they danced their going-out dance. It became customary to introduce each masque by means of an anti-masque, which Jonson defined as "a foil or false masque . . . not unaptly consorting with the current and whole fall of the device". It is chiefly Jonson's skill in writing anti-masques that gives his work the pre-eminence; some of his anti-masques (e.g. in *Love Restored*) contain excellent dialogue. The actors in the anti-masque and those who spoke or sang in the masque proper were frequently professionals. Masques were almost always performed at Christmas time, often on Twelfth Night, or else at Shrove-tide. They were almost all performed in the Banqueting House at Whitehall. The scenery, machinery, and dresses were usually designed by Inigo Jones, the music was written by Alfonso Ferrabosco and by Nicholas Lanier. The masque was the spoilt child of the arts—poetry, painting, and music were lavished upon it. It was a costly toy; *The Masque of Blackness* cost £8000, and *The Masque of Queens* £4000, immense sums of money in those days.—BIBLIOGRAPHY: P. Reyher, *Les Masques anglais*;

H. A. Evans, *English Masques*; M. Sullivan, *Court Masques of James I*; E. K. Chambers, *The Medieval Stage*.

Mass, in the Roman Catholic Church, the prayers and ceremonies which accompany the consecration of the eucharist. The word is used generally for all that part of the Catholic service in which the eucharist is offered. At present the mass consists of four chief parts: (1) the introduction; (2) the *offertorium*, or sacrifice; (3) the consecration; (4) the communion. These four chief parts, of which the three last are considered the most essential, are composed of several smaller parts, each having its proper denomination. They consist of prayers, hymns, shorter and longer passages of the Holy Scriptures, and a number of ceremonies, which, as the essential point of the mass is the sacrifice of the Lord, consist partly of symbolical ceremonies commemorative of important circumstances in the Saviour's life, or signs of devotion and homage paid to the presence of the Lord in the host. The order of these ceremonies, and of the whole celebration of the mass, is given in the missal or mass-book. The masses are modified according to many circumstances, e.g. according to the saint in honour of whom the mass is celebrated, or the seasons of the year connected with different events in the Saviour's life, or the purpose for which the mass is said, as the *missa pro defunctis* (mass for the dead). *Private mass* is an extraordinary mass, instead of that of the day, rehearsed on some special occasion. *Low mass* is the ordinary mass performed by the priest, without music. *High mass* is celebrated by the priest, assisted by a deacon and sub-deacon or other clergy, and sung by the choristers, accompanied by the organ and other musical instruments. Besides these there are different masses according to the different rites; the *Greek mass*, the *Latin mass*, the *Roman* and *Gregorian mass*, &c.—**BIBLIOGRAPHY**: L. Duchesne, *Origines du Culte chrétien*; C. H. H. Wright, *The Service of the Mass in the Greek and Roman Churches*; H. Lucas, *Holy Mass*; A. G. Mortimer, *Catholic Faith and Practice*.

Massachusetts, a maritime state of New England, United States, one of the original thirteen states. It has a large coast-line on the Atlantic, and is traversed by the Connecticut and other rivers; the coastal plain rises gradually to the east, where the Berkshire Hills run from north to south. The most important railways are the Boston and Albany, Boston and Maine, and the New York, New Haven, and Hartford Railway, all of which have termini in Boston, the state capital. There is a Boston-Cambridge elevated track, and a total electric mileage of 2836, the steam railway mileage being 2127 (1920). The state is divided into 14 counties

and contains 38 cities and 516 towns. Although it has been transformed from a rural to an industrial community, Massachusetts still has some agriculture, dairy- and sheep-farming, potatoes (4,000,000 bushels in 1920), maize, and tobacco being produced. Among manufactures are boots, leather, cottons, woollens, machinery, and paper; stock-yards, abattoirs, and canneries are prominent. A large foreign trade is carried on through Boston and eight associated minor ports, collectively called Massachusetts Customs District. There are seventeen colleges and universities (including Harvard), three of which are sectarian (two Roman Catholic, one Methodist), and five devoted exclusively to women; a State Department of Education exercises a general control. State area (including Atlantic islands of Nantucket and Martha's Vineyard) 8206 sq. miles, 227 sq. miles being water; pop. (1920), 2,852,350.

Massachusetts is supposed to have been visited by the Norsemen about A.D. 1000, but it was not permanently settled until the Pilgrim Fathers founded Plymouth (Dec., 1620). Other Puritans settled Salem (1628), subsequently called Massachusetts Bay Colony. Boston was settled in 1630. In 1692 the two original colonies were definitively merged. The government now consists of the General Court of Massachusetts, comprising a Senate (40 members elected annually from the 40 State Senatorial districts), and a House of Representatives (240 members elected from 165 districts, each returning a quota based on population). Two Senators and sixteen Representatives are sent to Federal Congress.—*cf.* L. A. Frothingham, *A Brief Outline of the Constitution and Government of Massachusetts*.

Mass Action, the law of, a principle in physical chemistry discovered in Christianity by Guldberg and Waage. Some chemical reactions take place much more quickly than others, the speed depending upon the strengths of the reacting substances. Guldberg and Waage found that the velocity at which a reaction proceeds is proportional to the product of the strengths of the reacting substances; thus if a substance A unites with a substance B to form a substance C, the speed at which the substance C is produced is proportional to the product of the 'strength' of the substance A by that of the substance B. The strength is technically called 'the concentration' and is usually measured in *mols* per litre, or, in other words, by the number of grammes of the substance present per litre, divided by the molecular weight of the substance. This law enables a definite mathematical equation to be written down expressing the rate at which the new substance is formed, in terms of the concentrations of the reacting

substances, and the solution of this equation gives the complete history of the chemical change from its start till the moment of its completion. On the other hand, the progress of the chemical change can often be studied experimentally and by comparing experiment with theory it is possible to determine the mechanism of the reaction. For instance, when arsine (AsH_3) decomposes into arsenic and hydrogen, one might suppose that, since $2AsH_3 = 2As + 3H_2$, the reaction proceeds by the union of a pair of molecules of arsine, with the formation of metallic arsenic and three molecules of hydrogen. The progress of this reaction can be easily studied, because 1 c.c. of arsine gives 1.5 c.c. of hydrogen, and hence, if the reaction proceeds at constant volume and temperature, the pressure must rise, and the rate of rise of pressure is clearly a measure of the rate at which the reaction proceeds. A curve can thus be plotted showing the amount of hydrogen present, in terms of the time. This curve can also be found by the law of mass action. If the reaction were $AsH_3 + AsH_3 \rightarrow 2As + 3H_2$, the rate at which the hydrogen is formed would depend on the square of the concentration of the arsine, for it is proportional, by the Law of Mass Action, to the concentration of arsine multiplied by the concentration of arsine. On the other hand, if it were a monomolecular reaction, due to the splitting up of the individual AsH_3 molecules, the velocity of reaction would be simply proportional to the concentration of arsine (not to the square of it). The curve giving the amount of hydrogen in terms of time on the latter assumption agrees with the experimental curve, and hence we conclude that the reaction is monomolecular. In this way the law affords valuable information as to the mechanism of chemical changes. In particular the law plays a most important part in the study of radioactivity, the various laws of decay of the activity of the radio-active substances being calculated by its aid and checked by experiment.—BIOGRAPHY: W. C. McC. Lewis, *A System of Physical Chemistry* (vol. i); J. H. Van't Hoff, *Lectures on Theoretical and Physical Chemistry*; R. A. Lefschelt, *Text-Book of Physical Chemistry*; F. F. Bissacre, *Applied Calculus*. *

Massa-e-Carrara, a province of Tuscany, North Italy. The chief product is Carrara marble. Massa, near Marina di Massa, its seaport, is the joint capital with Carrara. The pop. of Massa (commune) is about 83,800. Area of province, 688 sq. miles; pop. about 227,000.

Massage. See *Remedial Exercises and Massage*.

Massagetae (mas-saj'-tæ), a collective name given by the ancients to the nomadic tribes of Central Asia who dwelt to the east and north-

east of the Caspian Sea. Cyrus is supposed to have lost his life in fighting against them.

Masséna (mâs-â-nâ), André, Marshal of France, born in 1756 at Nice, died 1817. In 1775 he entered the French army, and became sous-officier-adjudant. During the Revolution he entered a battalion of volunteers, was elected chief of his battalion in 1792, and in 1793 made general of brigade. In 1794 he was appointed general of division, and took command of the right wing of the French army in Italy. In 1799 he defeated the Austrian and Russian forces at Zürich, and in 1800, by his defence of Genoa for three months, gave Bonaparte time to strike successfully at Marengo. In 1804 he was created marshal of the Empire. In 1805 he received the chief command in Italy. In 1807 he was given the command of the right wing of the French army in Poland, and soon after received the title of duc de Rivoli. In 1809 he distinguished himself against the Austrians, and at Esslingen his constancy and firmness saved the French army from total destruction. Napoleon rewarded him with the dignity of Prince of Esslingen. In 1810 he took command of the army in Portugal, and forced Wellington within the lines of Torres Vedras, till want of provisions compelled Masséna to retire. Napoleon recalled him from Spain, and in 1812 left him without a command. In 1814 he was made a peer by Louis XVIII, and though on the return of the emperor he acknowledged his authority, he took no active part in the events of the Hundred Days.—Cf. D. de Beauregard, *Le Maréchal Masséna*.

Massenet (mâs-nâ), Jules, French composer, born in 1842, died 1912. He studied at the Paris Conservatoire, of which in 1878 he became a professor. He composed several operas, of which the best known are *Herodias*, *Don César de Bazan*, and *Manon Lescaut*. His *Scènes Pittoresques* are also well known, and there is a long list of works by him, including the choral works *Maria Magdalene*, *Eva*, *La Vierge*, &c.

Massinger, Philip, English dramatist, was born at Salisbury 1583, and died in London in 1640. His father was a member of Parliament, and was attached to the household of the second Earl of Pembroke. He was educated at St. Alban's Hall, Oxford, which he entered in 1602 and left, without taking a degree, in 1606. The third Earl of Pembroke (often identified with Mr. W. H. of Shakespeare's *Sonnets*) was not a patron of Massinger's, and this has been explained by supposing that the dramatist became a Roman Catholic. The evidence is not conclusive, but there are indications in three plays which support this theory. *The Renegado* is a dramatized treatise on Christian evidences, *The Virgin Martyr* is a chronicle of Christian martyrdom, and *The Maid of Honour* ends with Camiola

taking the veil. Almost all that we know about Massinger's life apart from his plays is that he was often short of money. In his early days he almost invariably collaborated, sometimes with Dekker, oftener with Fletcher. Of the so-called Beaumont and Fletcher plays, at least eighteen are believed to contain the work of Massinger. When Massinger died, he was buried in the same grave as Fletcher. There are nineteen plays extant which are Massinger's in their entirety. Eight other plays were extant in manuscript until the middle of the eighteenth century, when they were used for pie-covers by Betsy Baker, the cook of John Warburton, F.R.S., who had got possession of them. Among Massinger's plays may be mentioned: *The Duke of Milan*, a fine tragedy; *The Great Duke of Florence* (1627), a masterpiece of dramatic construction; *The Picture*; *The City Madam* (1632); and his best-known play, *A New Way to pay Old Debts* (1633). The last-named play has long been a favourite, and has kept the stage for a long time. This is mainly on account of its leading character, Sir Giles Overreach, who was drawn from the infamous extortioner Sir Giles Mompesson, banished and degraded from knighthood in 1620. This character gives a leading actor a great opportunity. Massinger's excellent play *The Fatal Dowry* was shamelessly plagiarized by Nicholas Rowe, Poet Laureate and Shakespearean editor, in his *Fair Penitent* (1703), a play to which we owe the expression 'a gay Iothario'.

Massinger is perhaps the least poetical of all the early dramatists. Not only can he not write lyrics; his blank verse is pedestrian and undistinguished. If, however, he stands low as a poet, as a dramatist he stands among the first. He is a masterly constructor of plots, far surpassing Fletcher, Jonson, or Webster in this respect. He was a man of a far more serious cast of mind than most of his fellow playwrights. Some of his plays are as interesting as a novel, others as solid as a treatise on political philosophy. The drama was declining when he was writing, but he did not hasten, though he failed to delay its decline. He must be placed at the head of Caroline dramatists.—BIBLIOGRAPHY: Sir A. W. Ward, *History of English Dramatic Literature*; Sir Leslie Stephen, *Hours in a Library*; A. C. Swinburne, *Philip Massinger* (*Fortnightly Review*, July, 1889).

Massinissa, King of ancient Numidia. By the help of the Romans in the Second Punic War he added Western Numidia to his own kingdom of Eastern Numidia, having defeated Syphax, taking him prisoner with his wife Sophonisba, who had been promised to Massinissa. Massinissa now made her his wife, but Scipio Africanus, fearful of her influence, claimed her as a prisoner of Rome. Unable to resist,

Massinissa sent her a poisoned chalice, of which she voluntarily drank. Massinissa commanded the Roman cavalry on the right wing at the battle of Zama, which ended the Second Punic War (201 B.C.). His acquisition of a number of Carthaginian provinces led to the Third Punic War, in the second year of which he died (146 B.C.), aged about a hundred years. His grandson was Jugurtha.

Masson, David, critical and biographical writer, born at Aberdeen 2nd Dec., 1822, died at Edinburgh 6th Oct., 1907. In 1852 he was appointed to the chair of English language and literature at University College, London, and from 1865 to 1895 he occupied the chair of rhetoric and English literature in the University of Edinburgh. His works include an elaborate and comprehensive study of *Milton's Life and Times* (6 vols., 1858-80), *British Novelists and their Styles* (1859), *Recent British Philosophy* (1865), *Drummond of Hawthornden* (1873), *The Three Devils* (1874), an edition of *Milton's Poems* (1877), a *Life of De Quincey* (1878), and *Edinburgh Sketches and Memories* (1892).

Massowah, or **Massawa**, the chief port of Eritrea, on an atoll in the Red Sea, and joined to the mainland by a causeway. It is a pearl-fishing centre, and has a large transit trade. A railway runs from Massowah to Asmara, the seat of government (74 miles), with extensions to Keren (60 miles) and Asordat (54 miles). There is a wireless station at Massowah, ensuring communication between Collano (Italy) and Italian Somaliland. Pop. 2645 (400 European, mainly Italian).—The *commisariat* (district) of Massowah has an area of 6000 sq. miles; pop. 47,910. Asmara (altitude, 7765 feet) has a pop. of 14,711 (2500 Europeans).

Master and Servant. In legal acceptance a servant is one who owes his services to another for a limited period. Servants consist of two classes, namely, those who engage to perform certain duties for certain wages, and apprentices who may receive something by way of wages, but who have to be taught a trade. The chief classes of servants are: agricultural labourers, operatives or skilled labourers, and menials or domestic servants. In England, if the contract for service is for more than a year, it must be drawn up in writing; if for a year or less, or for an indefinite period, it may be verbal. If the contract is for a year, and if the servant is discharged without just cause during the year, he may claim wages up to the end of the year; on the other hand, if he leave without cause before the time, he can claim no wages at all. If he happens within the year to fall sick, or be hurt or disabled in the service of his master, the master cannot, apart from agreement, put him away or abate any part of his wages for that

time. In the case of a year's engagement, warning may require to be given a quarter before the service terminates. If a yearly servant is discharged for conduct warranting the discharge, all his wages may be forfeited. If a domestic servant be engaged under no special contract, a month's warning or payment of a month's wages is all that is necessary. Operatives may be discharged or may leave at a week, a fortnight, or a month's notice, according to the recognized local or trade usage. The grounds on which a servant may be legally discharged without warning are: wilful disobedience of lawful commands within the sphere of the service for which he is engaged, gross immorality, habitual negligence, dishonesty, permanent disability from illness, conduct incompatible with the due performance of his duties, and incompetence. A servant is liable to an action for gross neglect of his master's property, and also for fraud and misfeasance. In general if a servant refuse to enter service after engagement, or leave it without sufficient cause, he is liable merely to an action for breach of contract. A master has no right to chastise a servant, whatever the servant's age may be, but has the right of moderately correcting an apprentice under age. He is also liable in cases where his servant, in the ordinary course of his duty and acting within the scope of implied or expressed orders, injures a third party. A master can turn a domestic servant out of his house at a moment's warning without notice and without cause on payment of wages for the full term of the engagement, or for one month if there is no special contrary agreement. The death of the master discharges the contract; but in Scotland the servant can claim wages for the whole of the contracted period, though he is bound in that case to serve the master's executors. In case of the bankruptcy of the master the servant, if a labourer or workman, is a privileged debtor for wages due and unpaid for two months, but not exceeding £25, and ranks as an ordinary creditor for the balance; if he is a clerk, shopman, &c., the period is four months, and the preferential limit £50; but a labourer in husbandry, paid his wages in a lump sum at the end of his year of hiring, may be entitled to payment in full. In Scotland farm and domestic servants have a preference for their full wages for the current term.

Master of the Horse, the third chief officer in the royal household of Britain, whose duty it is to superintend the royal stables and all horses belonging to the king. He has the privilege of using the royal horses, pages, and servants, and rides next to the king on all State occasions. His tenure of office (annual salary £3000) is dependant upon the existence of his political party in power.

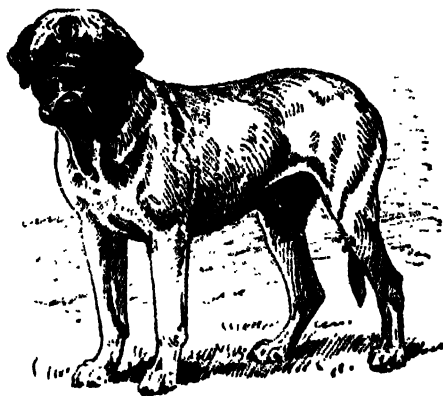
Master of the Rolls, one of the judges of the Chancery Division of the High Court of Justice, the keeper of the rolls of all patents and grants that pass the great seal, and of all records of the Court of Chancery. He is the third member of the Supreme Court of Judicature in England, and ranks after the Lord Chief Justice of England. The salary attached to the office is £6000 a year. Before the Judicature Act of 1873 the Master of the Rolls was permitted to sit in the House of Commons.

Master-Singers (Ger. *Meistersinger*), the name of a literary guild or association which flourished in Mainz, Strasbourg, Augsburg, Nürnberg, and various other German cities, in the fourteenth and fifteenth centuries. It represented the poetical efflorescence of burgher life as the Minne-singers had represented that of the feudal chivalry. The members of the guild met and criticized one another's productions in accordance with a remarkable series of canons dealing with literary form. Victory in their own competitions carried with it the right to take apprentices in song-craft, who at the expiry of their term, and after singing for some time with proficiency, were themselves admitted as full masters. Among the most famous master-singers were Hans Sachs, Henry of Meissen (Frauenlob), Regenbogen, Hadlaub, and Muscatblut. The development of artificial canons in the search for novelty ultimately reduced the whole scheme to utter absurdity.

Mastic, or **Mastich**, a resin exuding from the mastic tree (*Pistacia Lentiscus*), a native of Southern Europe, North Africa, and Western Asia. The resin, which is principally produced in the Levant, and chiefly in the Island of Chios, is obtained by making transverse incisions in the bark, from which it issues in drops. It comes to us in yellow, brittle, transparent, rounded tears, which soften between the teeth with a bitterish taste and aromatic smell. Mastic consists of two resins, one soluble in dilute alcohol, but both soluble in strong alcohol. It is used as an astringent and an aromatic. Its solution in spirits of wine constitutes a good varnish. Barbary mastic is obtained from the *Pistacia atlantica*, which grows in the north of Africa and the Levant. Mastic is consumed in vast quantities throughout the Turkish Empire as a masticatory for cleansing the teeth and perfuming the breath. It was formerly in great repute as a medicine throughout Europe. See also *Lentiscus*.

Mastiff, a race of large dogs found under various names from Tibet to England. The English mastiff is a noble-looking dog with a large head, a broad muzzle, lips thick and pendulous on each side of the mouth, hanging ears, and smooth hair, the height at the shoulder usually ranging from 25 to 29 inches. The old

English breed was brindled, but the usual colour to-day is some shade of buff with dark muzzle and ears. The Tibet mastiff, which is also a fine animal, is common in Tibet and in Bhutans as a house dog.



Mastiff

Mastiff-bat, a name given to tropical and subtropical American bats of the genus *Molossus*, from a supposed resemblance of the head to that of a mastiff.

Mastodon, an extinct genus of Proboscidea or elephants, the fossil remains of which first occur in the Miocene rocks of the Tertiary era, and which persist through the Pliocene and Post-pliocene periods also. In general structure the mastodons bear a close resemblance to the existing species of elephants. Their chief peculiarities consist in the dentition and structure of the teeth; the generic name is derived (*Gr. mastos*, breast), from the prominent mammillations on the molar teeth. The geographical range of the mastodons included America, Europe, and Asia—one species, *Mastodon longirostris*, having inhabited England, Germany, France, and Italy. A specimen, almost entire, of *Mastodon turicensis*, from the Pliocene deposits of Piedmont, measured 17 feet from the tusks to the tail; and an American specimen measured 18 feet in length and 11 feet 5 inches in height. *Mastodon angustidens* of the European Upper Miocene developed tusks in both jaws.

Matabeland, one of the two provinces of Southern Rhodesia. See *Rhodesia*.

Matagalpa, a department of Central Nicaragua, traversed by the Rio Grande. It is mountainous; sugar, tobacco, and coffee are produced. Matagalpa (pop. about 15,750) is the capital and the seat of a bishop, coadjutor to the Archbishop at Managua.

Matanzas, a province of Cuba, hilly in the interior, and a swamp at the coast. Sugar, bananas, rice, and tobacco are produced. Area,

8260 sq. miles; pop. (1919), 312,704. The capital, Matanzas, is the second seaport of the island, on Matanzas Bay, 55 miles by rail east of Havana. Vessels lie off in the roadstead. Sugar, rum, and molasses are exported. Pop. 62,000.

Matches. Prior to the early part of the nineteenth century, the principal method of producing fire was by means of the tinder-box. In 1805 Chance invented the lucifer match, which began to supersede tinder, flint, and steel about 1820. In 1827 matches known as 'Congreves' came into use. These contained the dangerous yellow phosphorus, but the red non-poisonous variety was discovered in 1845, and was afterwards used in Sweden for 'safety' matches.

In all types of matches ignition is due to a chemical reaction between oxidizing and reducing substances, with the resulting formation of a flame, the act of striking being sufficient to start the reaction. Potassium chlorate, nitre, manganese dioxide, potassium bichromate, and red oxide of lead are used as oxidizing agents. The reducing agents (oxidizable substances) comprise yellow and red phosphorus, phosphorus sesquisulphide, antimony sulphide, sulphur, and certain thiosulphates and sulphonylides. In addition, binding materials, such as glue, gum, and dextrine are added, also inert substances like powdered glass, sand, and whitening, to increase friction and moderate the reaction.

Matches at present in use may be divided into two classes: those which will strike on any surface, and those of the 'safety' type, which require a specially prepared surface for ignition. In the former class, the most satisfactory result is still obtained by the incorporation of a small quantity of yellow phosphorus in the mixture, but other materials are now largely employed. In 1898 the Belgian Government offered a prize for the best substitute for yellow phosphorus, which resulted in the use of phosphorus sesquisulphide. This substance is now largely used in France, where the manufacture of matches is a Government monopoly, and also to a certain extent in this country for the production of wooden matches. These, however, require a considerable amount of striking; for this reason the substance is not very satisfactory for the manufacture of wax vestas, which are too fragile to stand more than a slight amount of friction.

Safety matches are tipped with a mixture of which the following is a typical example: 50 per cent potassium chlorate, 5 per cent potassium chromate, 5 per cent powdered sulphur, 15 per cent glue and gum, and 25 per cent of filling and colouring matter. These materials are carefully ground and mixed together with water to form

a paste. The friction surface on the box is made of about 50 per cent red phosphorus, 10 per cent antimony sulphide, 25 per cent gum or glue, and 15 per cent lamp-black or brown pigment as filling and colouring materials. *Fuses*, for outdoor use in winds, are coated with a large, black head containing charcoal and nitre, the extreme tip only consisting of an ordinary ignition paste.

Manufacture.—Enormous quantities of matches are made annually. The industry exists chiefly in countries where timber is readily available, e.g. Norway and Sweden. England, France, United States, Belgium, Germany, and Austria import the timber and have large factories. The wood employed must be very straight-grained, and is used in the green state; the varieties most commonly employed are white and yellow pine and aspen. In this country the timber is sawn into rectangular pieces about $4\frac{1}{2}$ inches long, which are split so as to yield splints equal in length to two matches. In other countries a continuous band or veneer as thick as a match is turned off the rotating log and cut transversely and longitudinally into match-sticks. All these operations are performed by ingenious machines of special design, which are capable of turning out millions of splints per day. The match-sticks are then dried, sifted, and, in the most modern factories, fed on to a running belt at regular intervals, the belt being afterwards coiled so as to produce a bunch of splints, each one being thus separated from its neighbour. Both sides of the coil are dipped in paraffin and then in the ignition paste, after which they are placed in the drying-room. When the head is thoroughly dry the matches are cut in half and automatically packed.

Maté, or *Yerba Maté*, the plant that yields Paraguay tea, the *Ilex Paraguayensis*, a kind of holly, nat. ord. Aquifoliaceæ. It has smooth, ovate-lanceolate, unequally serrated leaves, much branched racemes of flowers, the subdivisions of which are somewhat umbellate. In Brazil and other parts of South America the leaves are extensively used as a substitute for tea, the name *Maté* having been transferred to the plant from the gourd or calabash in which the leaves are infused. Boiling water is poured upon the powdered leaves, then a lump of burned sugar and sometimes a few drops of lemon juice are added. Usually the infusion is sucked through a tube, sometimes of silver, having a perforated bulb to act as a strainer at the lower end. It contains theine, and acts as a slight aperient and diuretic.

Materialism, in philosophy, is the theory which, whilst conceiving the world as a unity, maintains that matter is at the base of everything. Nothing but matter exists, and all mental

phenomena are only the effects of matter. Mind, or what we call mind, is a product of matter, one of its manifestations, or one of the forms which ever-changing matter assumes. All 'psychical' phenomena are functions of one of our organs—the brain. Just as digestion is the function of the stomach, and the secretion of bile a function of the liver, thought is a function of the brain; it is a motion of matter, vanishing with it.

The brain is one of the most delicately constructed organs, and neither will nor emotions can exist without some corresponding brain manifestation, but an injured brain results in the derangement of mental functions.

The materialist, however, does not consider matter as an inert lifeless mass, into which a superior force infuses life and motion, but maintains, on the contrary, that it is ever-active. Force and motion are inherent in matter, manifesting themselves in various transformations, and life and thought are the result of a complex combination of the molecules of matter. Matter is infinite and imperishable, and its laws are immutable. Life and thought, as Buchner said, "are not what matter is, but what matter does".

All existence, including consciousness, is thus reduced to a modification of matter. Materialism denies the existence of a Divine Creator and of an immortal soul, although some Materialists, like Dr. Priestley, were deists. The latter denied the existence of a soul, but not that of a God.

Materialism is the first philosophical attempt to conceive the world as a unity, and is found in Buddhism, as well as in the religious systems of the Chinese and the Egyptians. The clearest exposition of materialism, however, is that of the Atomists, and especially of Leucippus and Democritus of Abdera, who explained matter as an aggregation of atoms, endowed with motion. They formulated the great principles of the indestructibility of matter and of the conservation of force. The theory was taken up by the Epicureans and defended by Lucretius in his poem *De Rerum Natura*. Nothing comes from nothing, and nothing is lost, neither an atom, nor a molecule, but only changes its form:

Imperious Cæsar, dead and turned to clay,
Might stop a hole to keep the wind away.

During the Middle Ages philosophers either adopted Aristotle's view distinguishing between matter and form, or adhered to the 'charcoal burner's simple and blind creed', as taught by the dogma of religion. But the doctrine of materialism was revived in England by Hobbes, and later on in France, where La Mettrie and Holbach, Helvetius and Cabanis were its apostles.

In Germany materialism followed as a reaction

against the idealistic systems of Fichte, Schelling, and Hegel, and the revival of natural science gave a new stimulus to the materialistic doctrine. Its exponents were Feuerbach, Moleschott, Buchner, Vogt, and Haeckel, who adduced a mass of new scientific facts in favour of his materialistic views. In England, Spencer and Huxley taught that, whilst mental phenomena can be referred to physical, the latter are also resolvable into mental, and that both were the manifestations of an unknown and unknowable reality (Agnosticism).

It cannot be said, however, that any of the systems of materialism are satisfactory. Mind and matter are certainly inseparably united within the sphere of the animal kingdom, but the Materialists rely too much upon conjecture, and can never explain satisfactorily either the ultimate nature of the atoms or the phenomena of consciousness by means of motion and atoms. In the course of evolution consciousness grows, develops, and becomes more complex. It is a distinct factor in the evolution of man, and thus cannot be a product of matter, one of its manifestations.—BIBLIOGRAPHY:

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Mathematics (Gr. *mathema*, to learn) is that branch of knowledge which deals with number and quantity. *Mathematics*, so called, concerns itself with the logical development of a series of fundamental abstract ideas, by the aid of appropriate symbols. Every deductive science must be based on certain undefined concepts and postulates, and in the history of mathematics, since the time of the Greek mathematicians, there have been two contrasting *motifs*, on the one hand towards the continual elaboration of the consequences deducible from the fundamental ideas and their application to the problems of natural philosophy and the arts, and on the other towards scrutinizing the basic concepts and postulates, and reducing them to the simplest and fewest. The extent to which the elaboration of mathematics has been carried out is reflected in such works as the *Encyclopédie der Mathematischen Wissenschaften*, which aims at giving a comprehensive yet concise summary of the present state of mathematics, its contributors being leading mathematicians throughout the world; or the *Revue semestrielle*, which gives each half-year, in about one hundred and fifty closely printed pages, a short description, or the title only, of the mathematical memoirs and articles appearing in about one hundred and fifty

periodicals (mathematical journals and published transactions of learned societies).

Pure mathematics may be classified under two heads, analysis and geometry, the former embracing arithmetic and algebra and their developments, including the calculus. Arithmetic, with its basic concept of the series of natural numbers, or integers, and the four fundamental operations of addition, subtraction, multiplication, and division (the *rational operations*), has been extended to apply to fractional, negative, irrational, complex, and other more abstruse types of numbers, and to include the theory of powers and logarithms. Common algebra, furnishing a set of symbols for undetermined numbers and for the arithmetical operations, enormously facilitates arithmetical reasoning, and again has given rise to other systems of algebra, such as Boole's Algebra of Logic, and the Algebra of Quaternions. Other branches of analysis are: trigonometry (in which arithmetic and algebra are applied to geometrical calculations), theory of series, theory of equations, the theories of combinations and permutations, of sets, of invariants, of determinants, of functions (a) of a real variable, (b) of a complex variable, (c) of several variables, and in particular the theories of algebraic, of exponential, of elliptic and hyperelliptic, of spherical harmonic, of Bessel's, and many other special functions. The calculus is founded on the notion of a *limit* (q.v.), and includes differential and integral calculus, differential equations and calculus of variations. The calculus of finite differences belongs rather to algebra proper than to 'the calculus', with which, however, it is interrelated.

A theory which has lately become prominent is that of integral equations, an integral equation being one which involves an unknown function under the sign of integration. Special examples were discussed by Laplace, Fourier, Cauchy, Abel, and Schlömilch, and the method was successfully applied to the solution of differential equations by Liouville. The recent great advances are chiefly due to Fredholm, Hilbert, and Volterra (cf. Whittaker and Watson, *Modern Analysis*).

While analysis may be considered as a development of arithmetic, which is based on the operation of 'counting', i.e. placing any assemblage of things in one-to-one correspondence with the natural numbers 1, 2, 3, &c., geometry is based on the idea of extension or space, and the operation of *superposition* of one figure upon another takes the place of 'counting' as the fundamental operation. Objection has been raised to the logical validity of this use of superposition, on the ground that the existence of ideal rigid figures which can be moved in space without change is inadmissible until rigidity has

been defined, and that no definition of rigidity is possible that does not involve the fallacy of 'reasoning in a circle'. This logical difficulty is avoided if, as suggested in the article *Geometry*, we take the co-ordinates as fundamental concepts, and treat geometry simply as a branch of analysis. There is, however, one very fundamental branch of geometry which is independent of metrical and projective properties and co-ordinates, that which has been variously named calculus of situation, topology, topics; examples of which are L. Euler's famous theorem $F + V - E + 2$, where F , V , E , are respectively the number of faces, of vertices, and of edges of a simple polyhedron, and J. B. Listing's very comprehensive generalization of it; also P. G. Tait's researches on the 'Topics' of knots.

In modern times, since Descartes, geometry has undergone enormous development chiefly by the aid of co-ordinate systems and analysis, and, in turn, analysis has had much light thrown upon its problems by geometrical considerations. In many practical applications of mathematics only a certain degree of approximation is required. In such cases graphical (i.e. geometric) methods are often employed where arithmetical or analytical methods would be inapplicable, or inconvenient from complexity (see *Graph*; *Nomography*). Mechanical aids to calculation (Amster's and other planimeters, the integrator, Napier's slide rule, equation-solving machines, &c.) supplement graphical methods of approximate calculation, and arithmetical machines of various types are available for adding, multiplying, &c.

The widest field for *Applied Mathematics* is in connection with the various branches of natural philosophy, viz. dynamics and hydrodynamics, the theories of heat, light, sound, electricity, and magnetism, the constitution of matter, and astronomy. Engineering calculations by analysis and by graphic methods also form an important branch of applied mathematics. The theory of probabilities is a branch of applied analysis which has more special applications to statistics and actuarial science.

For further information the reader may consult the articles on the various mathematical topics referred to above. The student of mathematics will find in the *Royal Society Catalogue* a complete list of mathematical publications up to the year 1900, and for later mathematical literature he may consult the *International Catalogue of Scientific Literature*, which includes a section for pure mathematics, as well as sections for mechanics, for physics, and for astronomy, which cover the most important part of applied mathematics, all classified both according to author and according to subject.—
BIBLIOGRAPHY: *Encyclopédie der Mathemati-*

schen Wissenschaften (nearly complete, a French edition in progress); E. Pascal, *Repertorio di Matematiche Superiori* (translated into various languages, an excellent, comprehensive, yet concise résumé of all the important theorems of mathematics); G. S. Carr, *Synopsis of Mathematics*; H. Weber and J. Wellstein, *Encyklopädie der elementaren Mathematik*; M. Cantor, *Geschichte der Mathematik*; W. W. R. Ball, *Short History of Mathematics*; F. Cajori, *History of Mathematics*; B. Russell, *The Principles of Mathematics*; A. N. Whitehead, *Introduction to Mathematics*; *Revue semestrielle des publications mathématiques*; *Fortschritte der Mathematik*.

Mather, Cotton, American writer, the eldest son of Increase Mather (1630–1728), one of the early presidents of Harvard College, born in Boston 1663, died 1728. He graduated at Harvard College in 1678, and in 1684 was ordained minister in Boston, as colleague of his father. In 1685 he published his *Memorable Providences relating to Witchcraft and Possessions*, which was used as an authority in the persecution and condemnation of nineteen victims burned for witchcraft at Salem in 1692. He left the reputation of having been the greatest scholar and author that America had then produced, his publications, some of huge dimensions, amounting to 382. Credulity, pedantry, quaintness, and eccentricity are blended in most of his works with great erudition.

Mathew, Theobald, popularly known as *Father Mathew*, Irish apostle of temperance, was born 1790, died 1856. He is chiefly famous for his celebrated temperance crusade, which was so successful that in a few months he had 150,000 converts in County Cork alone. A similar success attended his work in many Irish and English towns.

Mathews, Charles, English comedian, born in London 1776, died 1835. He made his debut at Richmond in 1793, and after ten years' acting in the provinces appeared in London in 1803. After playing with success at various theatres, he instituted, in 1818, a species of entertainment in the form of a monologue, which, under the title *Mathews at Home*, for five successive seasons drew crowded audiences to the English Opera House. He continued his entertainments for upwards of ten years, appearing at intervals in the regular drama. His powers of mimicry have perhaps never been surpassed on the stage, while his personal qualities won him the friendship of Coleridge, Lamb, and many other eminent men.

Mathews, Charles James, son of the preceding, born in 1803, died in 1878, long held a prominent place as a light comedian. He excelled in light eccentric comedies. Many of the plays in which he acted were written by himself.

Matlock, a town of England, in Derby-

shire, on the Derwent, 17 miles north-west of Derby, with lead-mines which employ a number of the inhabitants. Pop. 7035.—The village of Matlock-Bath, about a mile and a half distant, is a much-frequented watering-place, its medicinal springs being efficacious in bilious and rheumatic cases, gout, and incipient consumption. Pop. of Matlock-Bath and Scarthin Nick, 1825.

Matoniaceæ, a small family of primitive Leptosporangiate Ferns, section Simplicies. The only living forms are *M. pectinata*, with large fan-shaped leaves, and *M. sarmentosa*, both rare Malayan ferns; but in Mesozoic times the family was very prominent.

Matsumoto, an inland town of Honshu, Japan, on the Central Railway, west of Tokyo. It has a raw-silk trade and is a tourist centre. Pop. (1915), 50,400.

Matsuyama, a town of Shikoku, Japan, about 4 miles from Mitsu, its port on the Inland Sea. It is the centre of a light-railway system. Pop. (1918), 58,400.

Matsys, **Metzys**, or **Massys**, Quintin, Flemish painter, was born at Antwerp before 1400, and died there between 13th July and 16th Sept., 1530. He became a member of the Antwerp guild in 1491, and was a friend of Erasmus and Dürer. He painted chiefly life-size figures, which are much admired for their clear flesh tints and careful execution generally. Among his chief works are: a *Triptych with Pieta* (1508-11, at Antwerp), *The Money-changer and his Wife* (1518, Louvre), *Christ and The Virgin* (National Gallery), and *Advocate and Clients* (Dresden).

Matter, **Atomic** and **molecular theories** of. An atomic theory of matter is one which holds that material bodies are not infinitely divisible, but are made up of indivisible atoms, which are usually regarded as discrete and separated from each other by vacuous spaces. Such a theory was maintained by Democritus (q.v.) in opposition to Aristotle and celebrated in the magnificent poetry of Lucretius (q.v.). But it had little in common with the modern atomic theory, for it was applied primarily to philosophical problems and not to the explanation of experimental laws. Again, an atomic rather than a continuous theory of matter has always been adopted in speculations on the nature of compressibility and solution; but the definite conceptions which underlie modern chemistry and physics first appear in the explanation of chemical combination which was put forward by John Dalton in 1808.

Dalton supposed that any substance recognized in chemistry as an element (q.v.) was composed of a multitude of atoms, all having the same weight characteristic of the element. In a chemical combination resulting in the formation of a compound of the elements A, B, C, . . . ,

a atoms of A, *b* of B, . . . , unite with each other to form the ultimate particle of the compound, indivisible by physical processes and divisible only when the chemical combination is reversed. *a*, *b*, *c*, . . . are small numbers (the greatest value assumed by Dalton was 8) and are characteristic of the compound; different compounds of the same elements differ only in the values of *a*, *b*, *c*, . . . By this theory could be explained very simply the laws of 'constant', 'multiple', and 'reciprocal' proportions, which govern the proportions by weight in which elements enter into combination with each other; and by examining those proportions, values (known as atomic weights) could be assigned to the ratio of the weights of the atoms of other elements to that of the atom of hydrogen (see *Chemistry*). Further, as was natural, Dalton applied his theory to physics as well as to chemistry, and supposed that the discrete particles of which gases had long been supposed to consist were identical with the ultimate chemical particles — atoms in elements and the chemically combined groups of atoms in compounds. Dalton's theory has undergone no essential change. His conclusions concerning the values of *a*, *b*, *c*, . . . in various compounds have been corrected, and the limitation to small numbers removed. The theory has been extended by supposing that compounds may differ in the geometrical arrangement of the constituent atoms as well as in their number (see *Stereochemistry*). His physical theory is also retained with minor modifications. Avogadro showed that the densities of various gases were on the whole concordant with the assumption that equal volumes of gases at the same temperature and pressure contain the same number of ultimate particles; but discrepancies appear which make it necessary to modify the simplicity of Dalton's scheme if the rule is to be maintained. Nowadays the rule is accepted (for 'perfect' gases), and it is therefore concluded that the 'molecules' of gases (as the ultimate discrete particles are called) may consist of two or more atoms chemically combined, even when the gas is an element and all the atoms similar, and in compounds may consist of a multiple of the least number of atoms required by the chemical constitution.

It had long been suspected, e.g. by Bernouilli, (1788) and Clausius (1857), that the molecules of gases were in motion, that the kinetic energy of the molecules represented the thermal energy of the gas, and that their impact on the walls of the containing vessel produced the pressure. But the conceptions of this dynamical or kinetic theory (q.v.) of gases were first made definite by Clerk Maxwell (1860), who calculated the motions of such molecules on the assumption that, like elastic spheres, they exercised forces

on each other only at collisions. He deduced the distribution of the velocities of the molecules about the mean, and showed that, in a mixture of two gases with molecules of different weights, the mean kinetic energy of a molecule of one kind must be equal to that of the other kind. Since both gases in such a mixture must be at the same temperature, it follows that the temperature is determined by the mean kinetic energy of the molecule. Further, from the experimental laws of Avogadro, Boyle, and Gay-Lussac, it follows that the absolute temperature must be proportional to this kinetic energy. Maxwell's theory explained these laws (as did the earlier theories) and deduced from them the absolute value of the mean speed of a molecule; for hydrogen at 0° C. it is 1840 metres per second. But it gave also an adequate account of the viscosity and thermal conductivity of gases and evaluated from these the number (and therefore weight) and size of the molecules. The values obtained agree well with those found by more modern methods (which depend on the study of molecules when they are electrically charged), but there are unavoidable sources of error. Thus the size deduced for the molecule depends on its unknown shape, and all values are somewhat changed if it is assumed (more plausibly) that the molecules are not hard spheres, but more complex systems exerting forces on each other even when they are not in contact. The following are the best determinations: No. of mols. in 1 c. c. of perfect gas at 0° C. and 760 mm. pressure = 2.7×10^{23} ; mass of hydrogen mol. (2 atoms) = 3.32×10^{-24} gm.; diameter of hydrogen mol. = 2×10^{-8} cm.

The kinetic theory has received striking confirmation in recent years by the observation that when particles very small, but individually visible, are suspended in a fluid, they are continually in irregular motion (Brownian motion) with mean kinetic energies equal to that of the hypothetical and invisible molecules and with velocities distributed in accordance with Maxwell's law.

No theory as simple and complete as that for gases has been put forward for liquids or solids. In these states of matter the molecules (or possibly the atoms which compose them) exert forces on each other continually; even if the forces were known (and they are only just becoming known in very simple cases) the calculation of the motion and of the properties which depend on it would be very complex. Much progress has been made in recent years in our knowledge of the structure of crystalline solids (see *Quantum Theory and X-ray spectra*), from which it appears that the principles so successfully applied to gases may have to be modified considerably in their application to

more concentrated forms of matter; but there is no doubt that all forms are atomic in the most general sense.

Meanwhile attempts to explain the properties of atoms in terms of a structure of particles yet more ultimate have been much more successful. A bare reference will suffice to attempts to represent atoms as singularities in a primordial continuous medium, usually identified with "the Ether" (q.v.); for while such theories might explain the indestructibility of atoms, they could throw no light on the remarkable relations between the properties of different atoms which gave rise to Prout's hypothesis (see *Isotopes*) and are made still more striking by the Periodic Table (q.v.). These relations inevitably suggest that the atoms of different elements are built up of common constituents; the discovery of the electron (q.v.), which is such a common constituent, produced at once theories of the structure of the atom.

Electrons bear charges of negative electricity, while normal atoms are electrically neutral. Accordingly the atom must contain, besides electrons, some portion positively charged. All electronic theories of the atom represent its structure as determined by electrostatic (or, if the parts of the atom are in relative motion, electrodynamic) forces between the electrons and the positive part. Of the nature of the positive portion there was at first no evidence; the earliest electronic theories, following that of J. J. Thomson, represented it as a uniformly charged sphere throughout which the electrons were distributed. This choice, which is less plausible a priori than that of a positive particle, was dictated partly by mathematical tractability, partly by the need of introducing some quantity (e.g. the radius of the positive sphere) other than the number and charges of the particles, if the size of the atom was to be determinate. It had to be abandoned when Rutherford (1911) showed from experiments on the passage of α -rays (see *Radio-activity*) through atoms that, in accordance with a suggestion previously put forward by Nagaoka, the positive portion of the atom must be a particle of radius very small compared with that of the atom. The difficulty of indeterminateness was overcome by Bohr (1913), who suggested that the electrostatic laws were to be supplemented by quantum relations (see *Quantum Theory*) and the additional quantity supplied by Planck's constant h .

It is now known that the positive portion or 'nucleus' of the atom is a particle about 10^{-12} cm. in diameter, in which resides almost all the mass of the atom. It carries a charge equal and opposite to that on N electrons, where N is an integer characteristic of the atom and called

by Moseley the 'atomic number'. N is the ordinal number of the element in a series arranged in the order of increasing atomic weights, corrected in a few instances to remove the anomalies of the Periodic Table: for hydrogen it is 1, for helium 2, for lithium 3, and so on. The mass thus increases generally, but irregularly, with the atomic number. The nucleus is itself complex, and is decomposed spontaneously in radio-active disintegration, or artificially (in some cases at least) by the impact of α -rays; no circumstances are known at present in which this process is reversed. The constituents of the nucleus of the heavier atoms include hydrogen and helium nuclei together with 'cementing' electrons; it is possible that the helium nucleus is itself built of hydrogen nuclei. Plausible suggestions can be made concerning the exact composition of the various nuclei, but not of their arrangement or of the principles which determine it.

In its normal state (which is not necessarily that of most frequent occurrence) the nucleus is surrounded by N electrons, but in suitable circumstances a few of these electrons can be detached or a few others added. On the number and distribution of these electrons depend all the properties of the atom other than its weight, radio-active change, and effect upon α - or β -rays; in particular, chemical and mechanical properties and optical and X-ray spectra so depend. Since the distribution of the electrons is determined wholly by the change on the nucleus, these properties depend only on the atomic number and but very slightly on the mass (see *Isotopes*). When chemical combination takes place, the electrons normally surrounding the combining nuclei are redistributed, and the nuclei are held apart by their repulsion, counteracted by their common attraction for the electrons. It will be observed that the nucleus is the only permanent and characteristic part of the atom; the electrons can be transferred from one to another, and loss or gain of electrons does not change the element. On the other hand, a change in the nucleus is that from one element to another.

The general problem of the distribution of the electrons about the nuclei is not yet solved. According to Bohr's theory (see *Spectra, Theory of*), the electrons revolve round the nucleus in orbits which are special members of the class of those possible according to classical electrostatics and mechanics, but are selected by certain quantum relations. Owing to mathematical difficulties this principle can be applied with certainty only in the simplest cases, namely, when there is only one electron, or when the electrons are so close to a nucleus of large atomic number that the forces due to other

electrons are insignificant compared with those due to the nucleus. In other words, the theory can predict only the structure of the hydrogen and positively charged helium atom, and the distribution of those electrons which, in atoms of greater atomic number, are involved in the X-ray spectrum.

A theory of a different type, and to some extent inconsistent with this, has been proposed by Lewis and developed by Langmuir. Here the electrons are supposed to be distributed on shells surrounding each nucleus which contain, proceeding outwards, 2, 8, 8, 18, 18, 32, . . . electrons. The inner shells are filled first, so that an atom with $N \approx 19$ (say), would have shells of 2, 8, 8, 1 electrons. When two atoms combine chemically, the electrons arrange themselves so as to complete as far as possible the shells round the nuclei, and those compounds are most stable in which there are just enough electrons to fill all the shells, some electrons being common to the outer shells of two or more nuclei. The theory accounts well for many of the simpler chemical compounds, but is attended with difficulties in explaining the more complex. No reason is alleged why the electrons should be so distributed, and little light is thrown on properties other than chemical.

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Matthew, St., evangelist and apostle, son of Alphaeus; previous to his call a publican or officer of the Roman customs, and, according to tradition, a native of Nazareth. After the ascension of Christ we find him at Jerusalem with the other apostles, but this is the last notice of him in Scripture. Tradition represents him as preaching fifteen years in Jerusalem, then visiting the Ethiopians, Macedonians, Persians, and Syrians, and finally suffering martyrdom in Persia. His *Gospel* has been supposed by some critics to have been originally written in Hebrew, or rather Aramaic, but it is only found in Greek. The chief aim of this *Gospel* is evidently to prove the Messianic character of Jesus. See *Gospel*.

Matthew of Westminster, the name of the fictitious author of a chronicle entitled *Flora Historiarum*, written or compiled in the fourteenth century by monks of St. Albans and Westminster. Luard's edition of 1890 (8 vols.) is the most important, and in it the true character of the chronicle, which ends with 1325, was first established.

Matthias Corvinus, King of Hungary, second son of John Hunyadi, born in 1443, died in 1490. The enemies of his father kept

him imprisoned in Bohemia, but in 1458, at the age of sixteen years, he was called to the throne of Hungary. He maintained his position against Frederick III, repelled the invading Turks, and between 1468 and 1478 conquered Silesia, Moravia, and Lusatia; he was also victorious over the Poles, and took the greater part of Austria, including Vienna, from Frederick, and held all his extensive conquests till his death. He encouraged science and scholarship, and collected a great library (afterwards destroyed by the Turks) at Buda.

Matto Grosso (Port., dense forest), the largest state of Brazil after Amazonas, entirely inland, and mainly an elevated plain drained by a complex river-system. Gold, silver, lead, salt, diamonds, and precious stones are found. Rubber trees abound in its vast forests. Sugar, yerba-maté (Paraguayan tea), and tobacco are cultivated, and stock-raising is important. Cuyabá is the capital; Corumbá is commercially important. Area, 532,210 sq. miles; pop. (1920), 274,138.

Maubeuge, a frontier fortress and town of Nord, France, on the Sambre. Metal goods, porcelain, and machine tools are manufactured. Maubeuge is the junction of five railway lines opening upon the Franco-Belgian coal-fields, and as such the town became of enormous strategic value early in the European War. It was defended by General Fournier and 30,000 French troops, and was partially invested on 25th Aug., 1914; Fournier capitulated on 7th Sept., 1914. See *European War (Retreat from Mons)*. Pop. (1920), 274,138.

Maude, Sir Frederick Stanley, British soldier, born 1864, died 1917. The son of General Sir F. Maude, V.C., he came of a famous fighting family, and early joined the Coldstream Guards (1884), with which he served in the Sudan (1885). On passing Staff College he became brigade-major, Brigade of Guards (1897-9), served in South Africa with Lord Methuen and the Transvaal Force (1899-1900), was military secretary to the Governor-General of Canada (1901-4), and Assistant-Director of the Territorial Force (1909-12). In 1914 Maude proceeded to France with the 5th Divisional Staff, was severely wounded, and, on recovery, was posted to command the 13th Division at Gallipoli (with which he remained at the evacuation), in Egypt, and in Mesopotamia until his appointment as commander-in-chief there in Aug., 1916. Kut had fallen, and until that time the British Mesopotamian campaign had been a failure. In Dec., 1916, Maude advanced, captured Kut, and led his victorious army into Bagdad, 11th March, 1917. At Bagdad he contracted cholera and died. - Cf. Major-General Sir C. E. Callwell, *Life of Maude*.

Maule, a maritime province of Central Chile, drained by the River Maule and its affluents. Cauquenes is the capital, and the seaport (former capital) is Constitución. Area, 2812 sq. miles; pop. (1919), 110,465.—Maule City is in the province of Talca.

Maundy-Thursday, the Thursday in Holy Week, on which *maundy-money* is given in London by the sovereign to as many poor men and women as the years of his age. Pennies, twopennies, threepennies, and fourpennies in silver are coined for this purpose. It used to be the custom for sovereigns to wash the feet of poor persons and make them presents on this day. The name is derived from the Lat. *mandatum*, a commandment, the words *mandatum novum* occurring in *The Gospel According to St. John*, xiii, 34.

Maupassant (mô-päs-sän), Henri René Albert Guy de, French novelist, born in 1850, died 1893. He began his career as a clerk in the navy department, and served in the army during the Franco-Prussian War. Trained by Flaubert, whom he took as a model in the art of composition, he practised the art of story writing for years, destroying numerous MSS. before publishing his *Boule de Suif* in *Les Soirées de Médan* (1880). He then continued to cultivate the short story, and was soon rightly considered one of the greatest writers of short stories in the nineteenth century. Maupassant belongs to the realistic school, and, like Gorky and many other artists of this school, he studied life as an observer. He is never didactic, but faithfully portrays the reality of life. His style is sharp, clear, and precise, his delineation of character sure, brief, and exact. In a few terse lines he portrays a scene or a character. His stories, at once tragic and comic, even grim in their irony, reveal human meanness and selfishness, sordid brutality and cruelty. Besides his short stories he also wrote six long novels: *Pierre et Jean* (1888), in the preface to which he summarized the counsels of Flaubert and explained his theories on the aim of the novelist; *Une Vie* (1883); *Bel-ami* (1885); *Mont-Oriol* (1887); *Fort comme la Mort* (1889); and *Notre Coeur* (1890). The last two were evidently written under the influence of Bourget.—**BIBLIOGRAPHY:** A. Symons, *Studies in Prose and Verse*; R. Doumic, *Écrivains d'aujourd'hui*; H. James, *Partial Portraits*.

Maupertuis (mo-pär-twë), Pierre Louis Moreau, French mathematician, born 1698, died 1759. -The geodetic expedition to Lapland in 1736 excited much interest, and Maupertuis as chief of the party acquired an extraordinary reputation. In 1746 Frederick II appointed him president of the Royal Academy of Sciences at Berlin. His conduct as president appears to

have been more of a hindrance than a help to the eminent men, such as Euler, over whom he was not in authority. Maupertuis is usually, though on slight grounds, cited as the author of the *Principle of Least Action* in dynamics. In his later years he quarrelled with Voltaire who, somewhat unjustly, denounced him as a charlatan.

Maurice, John Frederick Denison, a leader of the Broad Church party, son of a Unitarian minister, was born in 1805 at Normanston, Suffolk, died in 1872. He took orders in 1835, and in 1836 he was appointed chaplain to Guy's Hospital. In 1840 he became professor of modern history and English literature in King's College, London, and in 1846 professor of ecclesiastical history, but in 1853 the publication by him of an essay on future punishment necessitated his resignation of both chairs. In 1866 he became professor of moral philosophy at Cambridge, a position which he held until his death.

Maurice of Nassau, Prince of Orange, stadtholder of the Netherlands, the youngest son of William the Silent, was born 1567, died at The Hague in 1625. He was elected stadtholder of the provinces of Zeeland and Holland on the assassination of his father in 1585, and subsequently of Utrecht, Overijssel, and Gelderland; and as commander of the army of the Netherlands he carried on war against the Spaniards with extraordinary success, driving them entirely out of the United Provinces. Previous to the truce of twelve years, concluded in 1609, when Spain was compelled to acknowledge the United Provinces as a free republic, about forty towns and several fortresses had fallen into his hands. He had defeated the Spaniards in three pitched battles, besides the naval victories which were gained by the vice-admirals of the republic on the coasts of Spain and Flanders. In 1621 the war with Spain was renewed, but the superior force under Spinola compelled Maurice to act upon the defensive only. He was succeeded by his brother Frederick Henry.

Mauritania, a French colony in North-West Africa, with a coast-line on the Atlantic, bounded north by Rio de Oro (Spanish) and south by Senegal (French). It was acquired by France in 1893, became a Protectorate in May, 1903, and was converted into a 'Civilian Territory' in Oct., 1904. Area, 347,400 sq. miles; pop. (1920), 240,144, of which 144 were Europeans and the remainder Moorish Muslims. The Roman *Mauritania* extended across modern Morocco to Western Algeria, and was bounded in the south by the Atlas range. From A.D. 40 it was a Roman province, and was held by the Vandals from A.D. 429 to 534, passing to the Arabs in A.D. 630.

Mauritius, an island and British Crown Colony of the Indian Ocean, 500 miles east of Madagascar. It is surrounded by coral reefs, and is mountainous, two peaks reaching 2600 feet and 2700 feet altitude respectively. The annual rainfall is heavy and the climate hot. Port Louis (pop. (1919), 40,106), fortified and garrisoned, is the capital and seaport. The bulk of the inhabitants are of Indian descent and embrace Hinduism, but the Protestant and Roman Catholic Churches are State aided. French is the prevailing language; English is used in the law courts; the Government debates are bi-lingual. The standard of coinage is the Indian rupee; weights and measures are on the metric system. Among exports are sugar (mainly to the United Kingdom), also fibre, coco-nut oil, and hemp; manures, coal, machinery, and cotton goods are imported from the United Kingdom. Education is free but not compulsory, and there is a subsidized Royal College. Area, about 720 sq. miles; pop. (1920), estimated at 364,493 (200,000 Indians and 3600 Chinese).

Mauritius was discovered by the Portuguese in 1505, abandoned and re-occupied by the Dutch (1598), who named it after Prince Maurice of Orange-Nassau. In 1710 the Dutch left, and about 1715 the French took possession, naming it *Île de France*. It fell to the British in 1810, and became a British possession in 1814 (Treaty of Paris). The Government consists of a Governor and Executive Council with a Council of Government (Governor and 27 members, 10 elected under a moderate franchise, 8 ex-officio, and 9 nominated by the Governor). The Chagos Islands (q.v.), Rodriguez (q.v.), Farquhar Island, Trois Frères, Six Islands, Solomon Islands, Agalega, and the St. Brandon group are dependencies of Mauritius. Total pop. (excluding Rodriguez), about 1870. — Bibliography: A. Walter, *The Sugar Industry of Mauritius*; A. Macmillan, *Mauritius Illustrated*.

Mausoleum (Gr. *mausoleion*), a sepulchral monument, so named from Mausolus, a king of Caria, to whom his wife Artemisia erected a monument which became so famous as to be esteemed the seventh wonder of the world, and to give a generic name to all superb sepulchres. From Pliny we learn that its height was 140 feet. In modern times the term is applied generally to a sepulchral edifice erected for the reception of a monument, or to contain tombs.

Maxentius, M. Aurelius Valerius, a Roman emperor, A.D. 306-312, son of Maximianus, and son-in-law of Galerius, whom he deposed. He reigned along with his father for a short time; was defeated by Constantine in 312, and in the retreat drowned in the Tiber.

Maxilla (Lat. *maxilla*, a jaw), the term applied in comparative anatomy to the upper

jaw-bones of Vertebrates, in contradistinction to the mandible or lower jaw; and in Invertebrata to the second or lesser pair or pairs of jaws. Thus in insects, spiders, crustaceans, &c., the maxillæ form definite and important organs in the trituration and division of food.

Maxima and Minima. A magnitude which varies with the time is, at a moment taken at random, either increasing or decreasing, but at certain special moments may be stationary. If it has just ceased to increase, and is just about to decrease, the magnitude is said to have a *maximum* value; a *minimum* value if it has just ceased to decrease, and is just about to increase. In a similar way, a function y of any independent variable x is, for a value of x not specially chosen, either increasing or decreasing as x increases, but may be a maximum or minimum for certain values of x . Now, if y is increasing with x when $x = a$, then dy/dx (see *Calculus*) is positive for $x = a$; if y is decreasing, dy/dx is negative. Hence, if y is a maximum or minimum when $x = a$, dy/dx must be 0 for $x = a$; the values of x corresponding to maximum or minimum values of y are therefore found by solving the equation $dy/dx = 0$. To discriminate between maxima and minima, we may consider the behaviour of dy/dx in respect of sign as x increases through a . For a maximum, the sign of dy/dx must change from + (when $x < a$) to - (when $x > a$); dy/dx must therefore be decreasing as x increases through a ; this will be ensured if d^2y/dx^2 (see *Lagrange's Theorem*) is negative for $x = a$. Similar conditions hold for a minimum. *Example:* Let $y = 32x - 4x^2$. Then $dy/dx = 32 - 8x$, and $dy/dx = 0$ when $x = 4$. For a maximum or minimum, $32 - 8x = 0$, or $x = 4$; also d^2y/dx^2 is negative for this value of x , so that y is a maximum for $x = 4$.

In questions on this subject, the graph (q.v.) of a function is always helpful and sometimes indispensable; on the other hand, for functions given by a formula, knowledge of the maxima and minima is of great use in tracing the graph. - Cf. F. F. P. Blauere, *Applied Calculus*.

Maximilianus, Marcus Aurelius Valerius Hercules, a Roman emperor, who became colleague of Diocletian in the empire A.D. 286. He endeavoured to murder his rival Constantine, to whom he had given his daughter Faustina in marriage, and being frustrated by the fidelity of the latter, strangled himself in 310. He was the father of Maxentius.

Maximilian I, Emperor of Germany, son of the Emperor Frederick III and of Elionora of Portugal, was born at Wiener Neustadt 1459, died 1519. In 1486 he was elected king of the Romans, and emperor in 1493. He first became an independent prince by his marriage with Mary of Burgundy, the daughter of Charles the

Bold, who was killed in 1477. This match involved him in a war with Louis XI, King of France, in which he was successful, though he was defeated at a later period by the Milanese. He was succeeded by his grandson, Charles V. See *Germany*.

Maximilian II, Emperor of Germany, born 1527, died 1576. He succeeded his father, Ferdinand I, in 1564; was tolerant of the Reformation, but did not join the Protestant Church.

Maximilian, Emperor of Mexico, known in his earlier life as *Ferdinand Maximilian Joseph*, Archduke of Austria, born at Vienna 1832, died 19th June, 1867. He was the younger brother of Francis Joseph I of Austria. In 1863 he was induced by the Emperor Napoleon, and also by a deputation of Mexicans, to accept the throne of Mexico. With this intention he entered Mexico in June, 1864. Maximilian was at first extremely popular; yet he failed to conciliate either the Church party or the Republicans, and the latter, under Juarez, rose in revolt. Having become involved in financial and political difficulties, Maximilian, with the approval of Napoleon, resolved to abdicate (1866), and he had proceeded to Orizaba when he was induced to return by the Conservative party in the state. The fighting which followed culminated in the capture and execution of the emperor and two of his chief generals. - **BIBLIOGRAPHY:** P. F. Martin, *Maximilian in Mexico*; J. M. Taylor, *Maximilian and Carlotta*.

Maximilian Joseph, King of Bavaria, born 1756, died 1825. He married his daughter to Eugene Beauharnais, son of Napoleon's wife Josephine, and had his duchy raised to a kingdom in 1806. In 1813 he joined the League against France.

Maximianus, Gaius Julius Verus, Roman emperor, the son of a peasant of Thrace. He entered the Roman army under Septimius Severus before 210, and gradually rose in rank until, on the death of Alexander Severus, he caused himself to be proclaimed emperor, A.D. 235. He was successful in his German campaigns, but his acts of barbarity and tyranny provoked an insurrection, in the attempt to quell which he was assassinated by his own soldiery, A.D. 238. The emperor is represented as being of immense stature and strength.

Maxwell, James Clerk, physicist, born 1831, died 1879. He was educated at the academy and university of his native town, Edinburgh, and afterwards at Peterhouse and Trinity College, Cambridge. He was professor of natural philosophy at Aberdeen (1856-60), and in King's College, London (1860-5). In 1871 he was appointed to the chair of experimental physics at Cambridge, and organized the now famous

Cavendish laboratory. Next to Kelvin, Maxwell was the greatest physicist of the second half of the nineteenth century. He revolutionized electrical theory, and the experiments which led to the discovery of electric waves were directly inspired by his electromagnetic theory of light (see *Ether; Light*). Maxwell wrote some admirable textbooks, and his *Treatise on Electricity and Magnetism*, *Theory of Heat*, and *Matter and Motion* are still widely read.—Cf. L. Campbell and W. Garnett, *James Clerk Maxwell*.

May, fifth month in the year, but third in the old Roman calendar. The Romans regarded it as unlucky to contract marriages during its course—a superstition still prevalent in some parts of Europe. On the 1st of May the old Celtic peoples held a festival called Beltane (q.v.). In former days outdoor sports and pastimes on the 1st of May were very common, and are not yet entirely given up. They included the erection of a *May-pole* decorated with flowers and foliage, round which young men and maidens danced, one of the latter being chosen for her good looks as queen of the festival, or 'Queen of the May'.

May-apple, a plant, *Podophyllum peltatum*, nat. ord. Berberidaceae (barberries). It is a native of North America, and its creeping root-stalk affords an active cathartic medicine known as *podophyllin*. The yellowish pulpy fruit, of the size of a pigeon's egg, is slightly acid, and is sometimes eaten.

Mayas, a race of Indians inhabiting Yucatan and the adjacent regions of Mexico and Central America, believed to be the descendants of those who built the great ruined cities of these parts. In ancient times, and especially from the third to the tenth centuries A.D., the Maya people were the most highly civilized people in America; and the culture of the rest of America in pre-Columbian times was derived directly or indirectly from them.

Maybole, a police burgh, Ayrshire, Scotland, on the Glasgow & South-Western Railway. It was the capital of Carrick, and is closely associated with the Kennedys, now represented by the Marquess of Ailsa, whose seat, Culzean Castle, is near Maidens, in the vicinity. Boots and agricultural implements are manufactured. Pop. (1921), 4436.

Mayenne, a department of North-Western France formed from parts of the pre-Revolutionary provinces of Maine and Anjou. It is traversed north to south by the Mayenne, which rises in the department of Orne and falls with its affluents, the Jouanne, Colmont, and Oudon, into the Sarthe (tributary of the Maine) near Angers. Stock and cereals are raised; cider apples are produced. Laval is the capital;

Mayenne (pop. 9000), once (1573) a seat of Charles, duc de Mayenne, son of the duc de Guise, is important. Area of department, 1986 sq. miles; pop. 262,447.

Maynooth, a village of Kildare, Ireland, 15 miles S.W. of Dublin, on the Midland Great Western Railway. There are ruins of the ancient stronghold of the Geraldines of Kildare, probably built by Maurice Fitzgerald (1176), a follower of Strongbow. The College of Maynooth, founded in 1793, exists for the education of candidates for the Roman Catholic priesthood. From its inception until 1860 it was State subsidized. The complete course takes from seven to eight years.

Mayo, a maritime county of Connaught, Ireland, the third largest of that country, with a long, irregular, island-studded coast-line on the Atlantic. It is drained by the Moy, Owenmore, and other rivers, and contains Loughs Mask, Conn, and Carrowmore. The western side is mountainous (Slieve Cor, 2369 feet; Nephin, 2646 feet; Mullren, 2688 feet). The Midland Great Western and the Great Southern & Western Railway systems traverse the county. Stock, oats and potatoes are raised, and there is some fishing. Castlebar is the county town; Westport, Newport, and Ballina are others. After the English conquest Mayo was the property of the Bourke (Burgh) family. Area, 1,333,356 acres; pop. about 102,500.

Mayor (Lat. *major*, greater), the chief magistrate of a city or corporate town in England, Ireland, the British colonies, and the United States; in Scotland called *provost*. The mayor is elected by the aldermen or councillors, and holds office for a year, but he may be re-elected. The Mayors of London, York, Dublin, and other cities are called 'lord mayor'; the Lord Mayor of London having also the title of 'right honourable', first allowed in 1354 by Edward III. Mayors are ex officio justices of the peace during both their year of mayoralty and the following one. See *Mansion House*.

Mayotte, or Mayot'ta, an island in the Indian Ocean, one of the Comoros, at the north-east entrance of the Mozambique Channel, and a French colony. In the valleys the soil is fertile. The chief exports are sugar and rum. Pop. 13,500.

Mazamet (má-zá-má), a town of Tarn, France, on the Arnette. It has manufactures of coarse woollens, flannels, and moleskins. Pop. 14,700.

Mazanderan, or Mazenderan, a province of Persia, bounded on the north by the Caspian. Along the Caspian Sea the land is flat and fertile, but southward it rises rapidly into the spur of the Elbruz Mountains. Sugar-cane, rice, cotton, and mulberry trees grow luxuriantly. The

capital is Suri, and the population of the province is estimated at 200,000.

Mazarin (mà-zà-ran), Jules, or *Giulio Mazarini*, first minister of Louis XIV and cardinal, an Italian by origin, born 14th July, 1602, died 9th March, 1661. He was educated at Rome by the Jesuits, thence proceeded to the University of Alcalá in Spain; entered the Pope's military service, and distinguished himself by diplomatic ability, for which he was rewarded with two canonicates, and the appointment of nuncio to the court of France (1634-6). Here he gained the favour of Richelieu; accepted service from the king, and became a naturalized citizen of France; was made a cardinal in recognition of his diplomatic services in Savoy; and in 1642, when Richelieu died, Mazarin promptly succeeded him. On the death of Louis XIII the queen, Anne of Austria, became regent for her young son, Louis XIV, and it was thought that Mazarin would be dismissed; but instead he gained over the queen-regent, and made himself master of the nation. Two parties in the State rebelled against this usurpation of supreme power by the cardinal. The Parliament of Paris denounced his increasing taxation, while the nobility dreaded his supremacy, and the combination of these malecontents resulted in the civil war of the Fronde (q.v.). As the immediate result of the conflict, Mazarin had to go into exile, but by the means of intrigue he formed a powerful royal party in the State, gained Marshal Turenne to his cause, and finally returned to his position at court in 1653. During the succeeding eight years he remained all-powerful in France; pursued the policy of Richelieu in foreign affairs; made an alliance with Cromwell; brought the Rhine provinces under the headship of France; and in the Treaty of the Pyrenees humiliated Spain, and gained much of French Flanders. Just as his foreign policy was successful, so was his home policy disastrous. He did nothing for the people but increase their taxes to fill an impoverished exchequer. Yet when he died Mazarin left an enormous fortune to his nieces, whom he had married into the most powerful families of Italy and France.—**BIBLIOGRAPHY:** Arthur Hassall, *Mazarin*; Mrs. Colquhoun Grant, *Queen and Cardinal*. •

Mazeppa, Ivan Stephanovitch, Hetman of the Cossacks, born about 1643, died in 1709. He became page to the King of Poland, and being detected in an intrigue with a Polish lady of high rank, Mazeppa was bound naked upon an untamed horse by her husband, and cast loose. He was found and released by some peasants, and afterwards joined the Cossacks, where his skill, sagacity, and strength procured him the position of hetman in 1687. He gained the confidence of Peter the Great, who made him

Prince of the Ukraine; but having entered into a treasonable intrigue with Charles XII, he suffered defeat with the Swedish monarch at Poltava, and fled to Bender, where he died. He is the hero of a poem by Byron, and a drama by Pushkin.

Mazzini (mât-sé'nē), Giuseppe, Italian patriot, born at Genoa 1805, died at Pisa 1872. His father was a physician and a professor in the university, and Mazzini studied with a view to following this profession, but afterwards took a new bent and graduated (1829) in law. While he was an advocate he turned his attention to literature, his first significant essay being *Dante's Love of Country*. As his writings grew more distinctly liberal in their politics the Government suppressed the *Indicatore Genovese* and the *Indicatore Livornese*, the papers in which they appeared. He afterwards joined the Carbonari, and was imprisoned in Savona for some months. On his release (1832) he was exiled to Marseilles, but was compelled by the French Government to retire into Switzerland. During the following five years he planned and organized various unsuccessful revolutionary movements, until, in 1837, he was expelled by the Swiss authorities and sought refuge in London. During the revolutionary movements of 1848 he proceeded to Italy; served for a time under Garibaldi; and when the Pope fled from Rome he became president of its short-lived republic, and made a heroic defence of the capital against the French, until compelled to surrender. From that time he continued to organize various risings in Italy, and the successful Sicilian expedition of Garibaldi in 1860 was due largely to his labours. For some time Mazzini was associated with Karl Marx in the first Socialist International organization. When Italian unity was accomplished under a monarchy, Mazzini accepted the results with reserve. The latter part of his life was spent chiefly between London and Lugano. Mazzini was a man of great and varied acquirements, and wrote both in French and English with elegance and facility. He was buried at Genoa.—**BIBLIOGRAPHY:** E. A. Venturi, *Josep. Mazzini: a Memoir*; Linton, *Recollections of Mazzini and his Friends*; Bolton King, *Life of Mazzini*.

Mazzola (mât-sô'la), or **Mazzuoli** (mât-sy-ô'lē), Girolamo Francesco Maria (called *Il Parmigiano*, the Parmesan), a painter of the Lombard school, born at Parma 1503, died 1540. His earliest works were in the style of Correggio, but in his twentieth year he went to Rome, where he came under the influence of Raphael and Michael Angelo, and was patronized by Clement VII. After the sack of Rome in 1527 he went to Bologna. His paintings are numerous both fresco and easel, among the best known being the *Virgin and Child with Saints* (of which

there are several repetitions), *Vision of St. Jerome*, *Lepid making a Bed*, *Baptism of Christ*, *Moses breaking the Tables of the Law* (fresco), &c. He was the earliest Italian etcher, and many of his engravings yet exist.

Meadow-sweet, a well-known British plant, *Spiraea Ulmaria*, nat. ord. Rosaceae. It grows



Meadow-sweet

on the banks of streams and in damp places, has pinnate leaves, and stems 2 feet high bearing corymbs of white fragrant flowers.

Measles (Morbilli; Rubella) is an acute contagious disease characterized by catarrh of the upper respiratory passages and a blotchy irregular rash. It is the commonest of all infectious diseases, and is widely distributed throughout the world. It is more prevalent in towns than in the country, and, though it may occur at any age, is much more common in childhood. It is estimated that by the age of fifteen at least 95 per cent of the population have been attacked. The incubation period is about fourteen days, and the principal symptoms are first catarrhal signs with rise of temperature, followed in three or four days by the rash, at first behind the ears and on the neck, and later spreading to the face and all over the body. Along with the appearance of the rash there is an aggravation of the catarrhal symptoms and increased fever. There is always a certain amount of bronchitis present and in severe cases it is marked, causing considerable respiratory distress. The most serious

complication is broncho-pneumonia, which occurs most frequently in children under three, and accounts for 70 per cent of the deaths from measles. Next to broncho-pneumonia the most serious complication is diarrhoea due to enteritis, and this usually arises in debilitated and weakly infants. Other complications are tonsillitis, laryngitis, gastritis, but none of these is nearly so frequent or so serious as broncho-pneumonia and enteritis. Throughout the illness great care should be given to treatment of the eyes and ears, as neglect of this may lead to weakened eyesight or chronic ear disease and deafness.

Measurement in Engineering. See *Tolerance*.

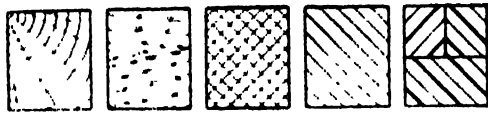
Meath, a county of Leinster, Ireland, with a short coast-line to the Irish Sea. It is traversed by the Boyne and the Blackwater, and is largely flat country. The Midland Great Western and Great Northern Railway systems serve the county. Trim is the county town; Navan and Kells are important. Cattle and sheep are raised; oats and potatoes are grown. Area, 577,735 acres; pop. about 65,000. Meath was one of the kingdoms of Ireland, and included Meath, Longford, West Meath, and parts of other counties. It was divided up in the sixteenth century.

Meaux, a town of Seine-et-Marne, France, on the Marne. The cathedral of St. Etienne is notable. Meaux was besieged by the English in 1520. During the European War the Germans reached Meaux (Sept., 1914)—their nearest approach to Paris. Pop. 14,000.

Mecca, a city of Arabia, capital of the Kingdom of Hejaz, and, as the birth-place of Mahomet, the holiest of all Mohammedan cities. It lies in a saucer-like valley among low hills, 70 miles east of Jeddah, its port on the Red Sea. Thousands of pilgrims annually perform the *hajj* (pilgrimage to Mecca), encompassing the Kaaba (q.v.), running seven times between the hills of Safa and Merwa, and listening to a sermon on the hill of Arafat in order to attain the dignity of a *hajji*. To non-Muslims the city is closed. Pop. nominally 80,000, but rising frequently to 180,000 during the *hajj*. See *Medina*; *Holy Carpet*.

Mechanical Drawing, the system of orthographic projection of plans, elevations, and sections used in engineering-works to show the exact construction of any machine or structure. The number of views required is reduced by the use of the conventions of showing the hidden parts in dotted or broken lines, and portions of views in section. Detail drawings are made full size or to some large scale. General drawings are made to scales of from about $\frac{1}{8}$ inch to 1 inch to a foot. Standard parts can, to some extent, be used in a range of machines, in which case they are shown in detail in the drawings, but reference is made to their identification and

store numbers in a table at the side. A number of conventions are used, such as showing bolt threads by thick and thin parallel lines; rivets, bolts, and studs by their centres only; and toothed wheels by their pitch circles. All drawings should be fully dimensioned, and over-all figures should always be given as a check to the others. Long details, such as columns, are usually not shown in full, but broken; and thin sections, such as boiler plate and girder sections, are blacked in. The views usually shown are plan, elevation, end elevation, and sections, which may be parts of the other views. Where



Wood across and with Grain.

Lead.

Cast Iron.

Wrought Iron.



Steel.

Cast Steel.

Brass.

Brickwork.

Stonework.



Insulators.

Lath.

Concrete.

Water.

Glass.

Shadings used on mechanical drawings to indicate the materials of construction

the parts are to be fitted to some scale of limits, a letter is placed after the dimension on the drawing to indicate the class of fit required; running, push, &c. (see *Tolerance*). Certain conventional shadings and tints are used to indicate the materials of construction. Tracings are made in Indian ink on cloth or paper. Photo-copying from tracings was introduced by Sir John Herschel, who used ferro-prussiate paper in 1840. Photographic blue or white prints are made from the tracings for use in the workshop. The tracing is placed against the glass of the printing-frame, commonly cylindrical, and the sensitized paper behind the tracing is acted on by the light from a rising and falling arc lamp. After the printing is complete the print is developed in water and dried.

Mechanics, Applied, deals with the application of the principles of dynamics and kinematics to engineering problems. It may be divided into strength of materials (q.v.), theory of machines (see *Machines, Theory of*), theory of structures (see *Structures, Theory of*), and hydraulics (see *Hydraulics and Hydraulic Ma-*

chinery). The units employed by engineers are not always those used in pure science. The main difference is found in the unit of force. The weight of one pound is the engineer's definition, and consequently it differs in magnitude according to the latitude and the height of the place of observation. The variation is not of great significance, and in many ways the unit is a useful one. All units dependent on force are dealt with in the same way, pressures being gauged in pounds per square inch, and work in foot-pounds.

Mechitarists (me-kit'a-rists), a society or sect of Armenian Christians acknowledging the authority of the Pope, but retaining their own ritual with a few alterations. They have printed the best editions of Armenian classics. The name originated from *Mechitar Da Petro*, who founded a religious society at Constantinople for the purpose of disseminating a knowledge of the old Armenian language and literature.

Mecklenburg-Schwerin, formerly a grand-duchy, and since 1918 a republic of Germany. It is bounded on the north by the Baltic Sea, elsewhere chiefly by Prussia and Mecklenburg-Strelitz; area, 5068 sq. miles; capital, Schwerin (pop. 43,452). The surface is flat, except where a ridge of low hills forms the watershed between the Elbe and the Baltic. The sea-coast is indented by several inlets, and lakes are very numerous. The streams flow partly to the Elbe, partly to the Baltic. The chief products are corn, peas, beans, potatoes, beet, and turnips. Both horses and cattle are exported. Distilling is largely carried on. Mecklenburg was proclaimed a republic in Nov., 1918, and the Constitution was promulgated on 17th March, 1920. Pop. (1919), 658,943. See *Wismar*.

Mecklenburg-Strelitz, formerly a grand-duchy, and since 1918 a republic of Germany; capital, Neu-Strelitz (pop. 11,401). It consists of two larger and several smaller districts; the former separated by the interposition of Mecklenburg-Schwerin, and the latter existing in separate patches. The whole area is estimated at 1131 sq. miles. Pop. (1919), 106,394.

Meconic Acid ($C_7H_4O_7$), an acid with which morphia is combined in opium. When pure, it forms small white crystals. Its aqueous solution gives a deep red colour with ferric chloride, and a bright yellow colour with silver nitrate, to which a drop of ammonia has been added.

Meconopsis, a genus of Papaveraceæ, natives of temperate mountains. *M. cambrica* is the Welsh poppy; *M. wallichii* is a beautiful blue-flowered poppy of the Himalaya.

Medal, a piece of metal, generally in the shape of a coin, struck or cast to commemorate some person or event. It should be distinguished from a *medallion*, the term usually applied to a

circular bas-relief in sculpture; and from a *jaquette*, a small piece of metal decorated on one side only, for application as ornament. The history of the medal is closely bound up with that of coinage, but at certain periods it has had an independent life of its own. It differs from a coin in that the metal used is chosen from the artistic point of view, the baser metals, such as bronze and lead, in fact providing the best material; and, not being intended for circulation, size and the amount of relief can be greater than in a coin. Almost invariably a medal is decorated on both sides, the *obverse* bearing a portrait, the *reverse* a historical or heraldic design. The latter was usually the case in Germany, while the Italians favoured



Medal commemorating the Defeat of the Spanish Armada

a personal device known as an *impresa*, which form a kind of bastard heraldry whose meaning is often obscure. The great age of the medal as an artistic product is the Renaissance; and it admirably reflects the assertion of human personality characteristic of that period. In the fifteenth century, Italy was the chief centre of production, and Antonio Pisano (1380 to about 1456), known as Pisanello, was the most celebrated medallist. His medals made for Leonello d'Este of Ferrara and for the Malatesti of Rimini are unsurpassed in any age. Notable contemporary or slightly later medallists are Matteo de' Pasti of Verona, Sperando of Mantua, Giovanni Boldu of Venice, Caradosso Foppa of Milan, Cristoforo di Geremia of Mantua, who worked mainly at Rome, and Nicolo Fiorentino of Florence. Early medals were cast from a preliminary design made in wax or similar material, whose character helped the artist to secure both unity and delicacy of detail. In the sixteenth century striking from dies became the usual practice, a method much used by Benvenuto Cellini, and by his contemporary Leone Leoni of Milan. This introduction of a mechanical element, and the difficulty of making the die, combined with

mannered imitation of Greek and Roman coins to cause a decline in the art of the medal. Italian influence soon spread to Northern Europe. The most independent school was that of Germany, where, in method of production and final result, the medal represented the art of the goldsmith rather than of the sculptor. The chief centre was Nuremberg, where Dürer designed, if he did not make, several medals. In France the Italian tradition found more congenial soil. In the fifteenth and sixteenth centuries some remarkable medals were produced at Lyons, Vienne, and Tours, to commemorate royal visits to these towns; and, in the seventeenth century, Guillaume Dupré and Jean and Claude Warin are notable for their technical skill. In England no native school developed until the seventeenth century, when Abraham Simon and his more famous brother Thomas were at work. In later centuries medals were produced in large quantities, especially in France for Louis XIV, Louis XV, and Louis XVI, and for Napoleon I; but their artistic value is small. Of late years there has been somewhat of a revival in the medal, wherein France has played a leading part. **BIBLIOGRAPHY:** Hill, *Pisanello and Medals of the Renaissance*; Forrer, *Biographical Dictionary of Medallists*.

Medal, an honourable distinction conferred by the sovereign or the State on those who have taken part in a naval or military capacity in a given campaign, and a record of services performed. The custom of granting medals as rewards is a very ancient one, dating back as far as the Roman era; then, many hundred years later, it was revived in England by Queen Elizabeth, who, as an outward sign of approval, conferred a jewel and badge on Sir Walter Raleigh, while in the next century Charles I decorated one R. Welch with a gold medal for gallantry in action at the battle of Edgehill. These and others were given for individual acts which, no doubt, closely concerned the sovereign, and it was left to Oliver Cromwell, after the battle of Dunbar in 1650, to make the first general issue of medals to all the Republican troops engaged in the battle, irrespective of rank or individual merit. After the Restoration the matter of medals again retired into the background, and no further general issue to troops was made till after the battle of Waterloo, 165 years later. This, the Waterloo Medal, was issued in 1817 to all troops engaged, and was worn with a red ribbon with blue edges, the ribbon being practically the same as that selected seventy years later for the Distinguished Service Order. Waterloo, though the last battle of the Napoleonic wars, was the only one for which a separate medal was awarded to officers and men alike, though, in accordance with the

custom of the times, a number of gold medals had been presented to high commanders from time to time, and it was not till 1848 that it was decided to issue a medal designed to cover the whole period of the wars from 1793 to 1814. This medal, known as the Military General Service Medal, and worn with the Waterloo ribbon, was accordingly issued to any survivors who could be found, and was provided with 'clasps' or 'bars' bearing the names of the different engagements commemorated; at the same time a Naval General Service Medal was issued, with a blue and white ribbon. It may be here convenient to explain very briefly the meaning of the words 'clasps' or 'bars' in connection with medals. From 1817, in the case of medals awarded by the sovereign, and from a good many years earlier in the case of those issued by the Honourable East India Company in India, it had been the custom to strike a separate medal for each battle selected for commemoration, quite regardless of the fact that two or more battles might have been incidents in the same campaign; consequently the number of medals and incidentally the expense increased alarmingly, e.g. in India alone something like two dozen medals had been issued between 1795 and 1843, of which four were awarded for the first Afghan War. When, therefore, it was decided to commemorate the Napoleonic wars posthumously, the plan was adopted of making one medal do for the whole set of campaigns, and of marking individual battles and expeditions by a bar suitably inscribed and intended to be worn across the ribbon in the form of a brooch or clasp, and this arrangement has been continued ever since. In the case of a group of campaigns more or less connected and extending over a considerable number of years, the medal is termed a 'General Service Medal', e.g. 'India General Service', 1854-95 (ribbon three red and two blue perpendicular stripes); 'India General Service', 1908 onwards (ribbon blue and green). When the campaigns are unconnected with any others, a separate medal and clasps are given, e.g. 'Afghanistan', 1878-80 (ribbon red and green); 'China', 1900 (red and yellow); 'Queen's South Africa', 1899-1902 (red, blue, and yellow).

In the European War four medals and stars have been given, of which three can have been earned by any one man. They are: the 1914 Star; the 1914-5 Star (ribbon red, white, and blue, watered); the British War Medal (blue, black, white, and orange); and the Victory Medal, with ribbon of watered silk. Of these four, over 7,000,000 were issued between July, 1919, and Sept., 1921.

Bars to the British War Medal are to be awarded in due course, and it is probable that

these will be given for campaigns or phases of the European War rather than for individual battles.

No description of medals can be complete without mention of the Victoria Cross. This, though strictly speaking more in the nature of a decoration than a medal, is, as is well known, given simply and solely as a reward for an outstanding act of gallantry in face of the enemy. Other medals coming more under the head of decorations are the Military Medal and the Distinguished Conduct Medal, for the rank and file of the army, and the Conspicuous Gallantry Medal and the Distinguished Service Medal, for the navy.

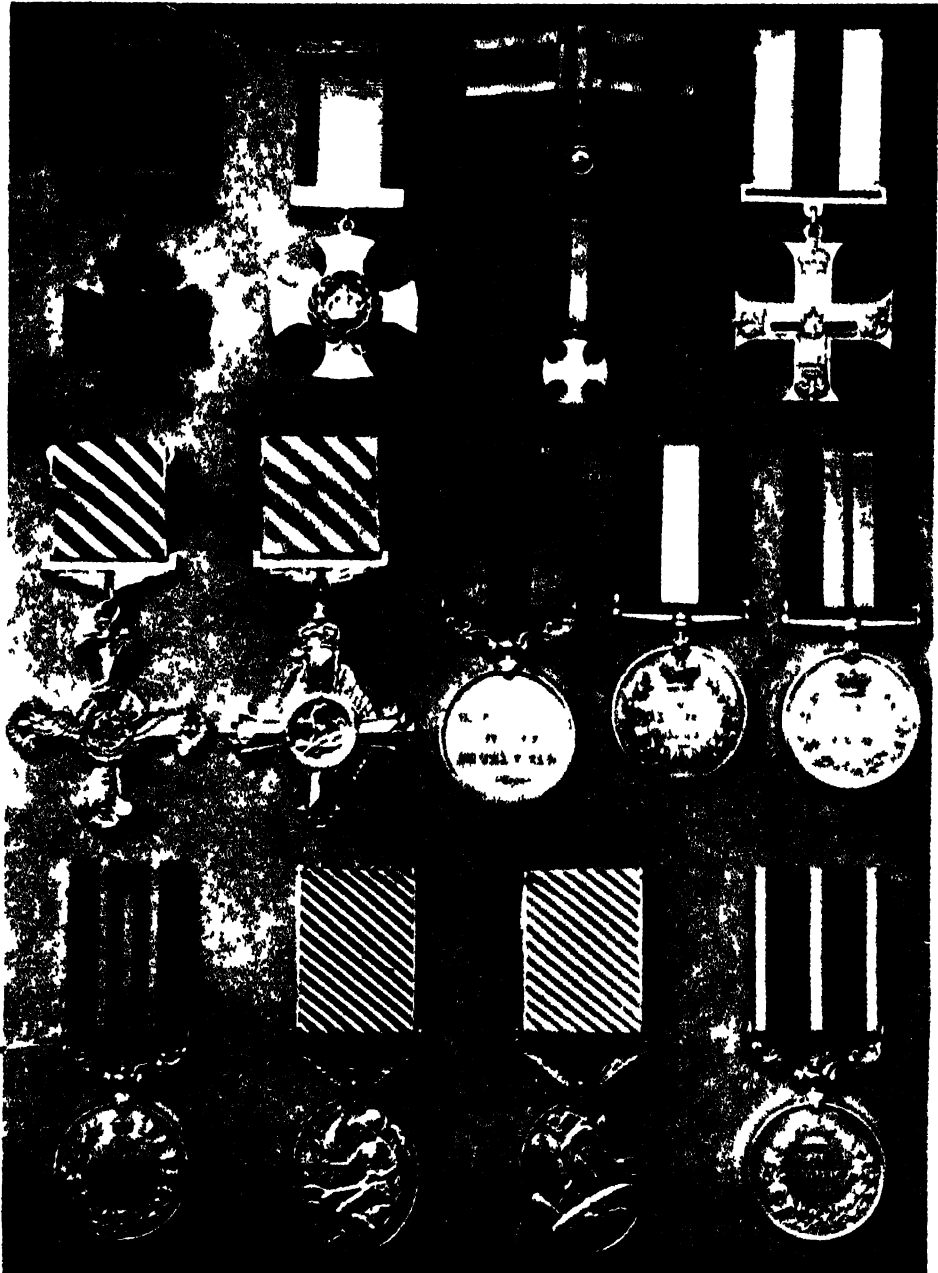
In uniform the actual medals are only worn in full dress on the left breast; on all other occasions the ribbons only are worn, the one exception being that officers in mess-dress wear miniature medals and decorations. Medals and decorations granted by foreign powers are worn in uniform by His Majesty's permission only; the medal of the Royal Humane Society (ribbon dark blue) is worn by military or naval recipients on the right breast.

Medea, in Greek mythology, daughter of Æetes, King of Colchis. She enabled Jason to obtain the celebrated golden fleece, and lived with him for ten years, until he discarded her in favour of Glauce or Creusa, daughter of King Creon. In revenge she sent Glauce a bridal robe which enveloped her in consuming flame, and thereafter she slew her own children by Jason. The tragedies of the name of *Medea* by Æschylus and Ovid have perished, but the *Medeas* of Euripides and Seneca are extant. The story has also been treated by Corneille and by Grillparzer, and is the subject of an opera by Cherubini. See *Jason*; *Argonauts*.

Medellin, the second largest town of Colombia, capital of the department of Antioquia; altitude, 4000 feet. It is a centre for the gold-mines (Antioquia), has a transit trade, and is the seat of an archbishop. Pop. 79,146.

Media, an ancient country in Western Asia, formerly the seat of a powerful kingdom, corresponding nearly to the north-western portion of modern Persia. According to the Greek historians, Deioces, 708-655 B.C., was the first native king, but the true founder of the great Median monarchy was Cyaxares, 633-593 B.C. He extended his dominion over the highlands of Southern Armenia and Asia Minor as far as the Halys, overthrew the Assyrian monarchy, and in conjunction with Nabopolassar, King of Babylon, destroyed Nineveh in 607 or 606 B.C. Astyages, the successor of Cyaxares and the last king, reigned for thirty-five years, 593 to 558 B.C., when he was overthrown or deposed by Cyrus. Media henceforward formed part of the

BRITISH SERVICE MEDALS AND DECORATIONS



Persian Empire, and shared its fate. Cyrus is supposed by some authorities to be the Darius the Mede mentioned in the *Book of Daniel* as reigning over Babylon after its conquest by the Persians.

Medical Act, an Act for the registration of medical practitioners, passed 2nd Aug., 1858, and amended by subsequent Acts. The Act establishes a general council for the United Kingdom, with branch councils for England, Scotland, and Ireland. The members are appointed by the Crown, the medical and surgical corporations, and the universities. They are appointed for a term of five years, and are eligible for re-election. The chief function of the councils is to register such persons as are qualified to practise medicine or surgery in the three kingdoms; and any fellow, licentiate, or extra-licentiate of any of the medical bodies named in the Act, or possessing any of the qualifications scheduled in the Act, is entitled to be registered on payment of a fee of £5. The general council has power to remove the name from the register of any person who has been guilty of crime or of malpractices in his profession. Further, any person who obtains registration by false statements is liable to be imprisoned for twelve months, and anyone falsely claiming to have been registered is liable to be fined £20. The registrar of the general council publishes annually *The Medical Register*, containing the names of all persons appearing on the general register on 1st Jan. in each year. Registered persons are entitled to practise medicine and recover medical fees in all parts of the United Kingdom. The council also publish *The British Pharmacopœia*, a list of medicines and compounds and the manner of preparing them.

Medical Jurisprudence, the application of medical knowledge to questions of civil and criminal law. The evidence obtainable from medical practitioners is frequently the most significant in the whole case. The questions involved in this subject are those of injuries to the person, and the civil and social rights of individuals. Assaults of all characters, fatal or not fatal, raise legal questions very difficult of solution. In the case of death it is commonly difficult to decide whether the wounds were self-inflicted, and medical testimony and deductions from the position of the body, the common capabilities of movement of hand and arm, the position and line of the wounds, and the effects upon the internal organs are the matters on which the decision is based. Great cunning has been shown by some murderers in making the death appear the result of natural causes or due to suicide. In poisoning cases it is necessary to know the properties of the poison used and its actions upon the human body. The court

has frequently to decide whether the poison could be taken in mistake for some other substance due to faulty labelling or other negligence. The cause of death is determined by post-mortem examination, and chemical analysis of the contents of the various organs. If little or nothing is known of the properties of the poison used, experiments upon animals must be resorted to for information. Bodies are found in water in which they have been placed after death. The post-mortem examination provides evidence as to whether the case is one of drowning or not, by the characteristic actions upon the lungs and other organs. In questions relating to criminal responsibility, validity of contracts, and the identification of a living being or corpse the knowledge of the characteristic development of the human frame is of great value. Statistical records of longevity, and the prevalence of and mortality due to specific diseases are treated in this subject, and also form the basis of the estimates of insurance risks. The identification of persons long absent from their homes, perhaps exposed to hardships, wounds, and foreign climates, is of importance in settling claims of succession to titles and estates. Marriage and parentage provide complicated cases of rights to estates in which medical evidence, though it can never be exact, provides a guide that is equitable. Deviations from a recognized normal state have been acknowledged in test-case decisions, and have thus established the degree of variation in human functions which may be considered reasonable. The detection of malingering among claimants from insurance companies and public funds, recognition of maladies exempting people from public duties, and of the signs of insanity form important sections of this subject. Cf. J. Glaister, *A Text-book of Medical Jurisprudence and Toxicology*.

Medici (mă'di-chē), a Florentine family which rose to wealth and influence by successful commerce, and whose members combined the career of merchants and bankers with the exercise of political power, a princely display of private munificence, and a liberal patronage of literature and art. The Medici were associated with the history of the Florentine Republic from an early period, but they first became prominent in the person of Salvestro, who became gonfalonier in 1378. Giovanni de' Medici (1390-1429) amassed great riches by trade, rendered great services to the city, and in 1421 became gonfalonier. He was succeeded by his son Cosmo (the elder, 1389-1464), surnamed the *father of his country*. Cosmo acquired immense wealth and influence, and laid the foundation of his reputation by his munificent patronage of art and letters, and the conjunction of consummate statesmanship with his commercial enterprise. He was for

thirty-four years the sole arbitrator of the Republic and the adviser of the sovereign houses of Italy. His grandson Lorenzo the Magnificent (1449-92) was the second great man of the House of Medici. He governed the state in conjunction with his brother Giuliano (1453-78) till the latter was assassinated by the Pazzi, a rival Florentine family. Escaping from this massacre, he sustained a war with Ferdinand of Naples, with whom he signed a definitive peace in 1480. The rest of Lorenzo's reign was passed in peace, and in those acts of profuse liberality and munificent patronage of arts and sciences in which he rivalled or excelled his grandfather. He left three sons: Piero (1471-1503), Giovanni (afterwards Pope Leo X), and Giuliano, Duke of Nemours. Piero succeeded his father, but was deprived of his estates when the French invaded Italy in 1494. He finished his career in the service of France. His eldest son Lorenzo came to power after the abdication of his uncle Giuliano, who became Duke of Urbino. He died in 1519, leaving a daughter, the famous Catherine de' Medici, Queen of France. After several reverses in the family, Alessandro, an illegitimate son of the last named Lorenzo, was restored to Florence by the troops of Charles V, and by an imperial decree he was declared head of the Republic, and afterwards Duke of Florence. The next name of importance in the family is that of Cosmo 'the great', in 1537 proclaimed Duke of Florence and afterwards Grand-Duke of Tuscany. A learned man himself, he was a great patron of learning and art, a collector of paintings and antiquities. He died in 1574. Francesco Marin, his son, obtained from the Emperor Maximilian II, whose daughter Joanna he had married, the confirmation of his title of grand-duke in 1575, which continued in his family until it became extinct in 1737 on the death of Giovanni Gasto, who was succeeded by Francis, Duke of Lorraine. See *Tuscany; Catherine de' Medici; Marie de' Medici*. BIBLIOGRAPHY: W. H. O. Smeaton, *The Medici and the Italian Renaissance*; Janet Ross, *Lives of the Early Medici as told in their Correspondence*; *Cambridge Modern History* (vols. i, ii); Ch. Vriarte, *Florence*.

Medicine. From earliest times in all nations there has been some method of treating disease, and wherever the art of writing was practised records of these methods have been preserved in some kind of system of medicine. In primitive societies the priest, the magician, and the medicine-man were one and the same. Black magic produced drought, famine, disease, and death; white magic averted these. In its origin, medicine was a form of white magic.

Naturally medicine did not progress very far so long as it was under the sway of the supernatural, but as the savage advanced a little

further in the knowledge gained by experience, special talent was developed in herb-doctoring, bone-setting, and rude surgery, and this was employed as a means of livelihood by certain individuals. A knowledge of herbs and some surgical skill were possessed by the medicine-man of these primitive tribes, and further development of such methods, along with belief in the supernatural and its effects, were largely the basis of the medical principles and practices of the ancient civilizations of Egypt, Persia, Mesopotamia, India, and China. It is not until we come to the medicine of the Greeks that we find a fundamental change of principle, which removed the study of medicine from mere folklore, and brought about the foundations of medical principles as they are understood to-day.

In contrast to these ancient systems, which were based on a belief in the supernatural, the Greeks based their study of medicine on observation of the signs and symptoms of disease. The earliest Greek medical school was that of Cnidos, a Lacedaemonian colony, and its origin reaches back to 700 B.C., while a later school began on the Island of Cos about 600 B.C., and flourished for several centuries. Out of this latter school came Hippocrates, known as the 'Father of Medicine'. His period of greatest activity was about 400 B.C., and he led a somewhat wandering life throughout Greece, teaching in various centres and leaving many pupils to carry on his methods and traditions. His methods have been preserved in the *Hippocratic Corpus*, a collection of about seventy separate books, which gives the principles and spirit of his system. The method of the Hippocratic writers is that known to-day as the inductive, and the greatness of the man is made evident when we consider his patient observation of fact, his scepticism concerning the marvellous, his hesitation to theorize beyond data, and, on the other hand, his ability to generalize from actual observation, and his faithful and effective treatment of the sick. His spirit is well shown in the famous 'Hippocratic oath', still the ideal of the profession of medicine, and respected by all civilized peoples to-day. The history of Greek medicine did not end with Hippocrates, but continued active for more than five centuries. Various schools of thought arose, and, finally, though Greek intellect was as creative as before, a decay of the spirit was reflected in the medical, as in the literary, products of the time. In the second century of the Christian era this great period came to an end, but not before its influence had spread westward, for it was in Rome that the second great figure of ancient medicine, Galen, began to practise, but he early retired to devote himself to study, travel, and

teaching. His energies were many-sided, and his works are an encyclopædia of the knowledge of his time. Along with his widespread knowledge and wonderful observation, however, went a dogmatic nature and a tendency to find plausible explanations for every phenomenon, which resulted in the simple observation and interpretation of facts by Hippocrates being replaced by an elaborate system of medical philosophy. The effect of Galen's dogmatism and infallibility upon Europe in the centuries to follow has been extraordinary, and it may be said that medicine remained practically stationary for fourteen centuries after his death. With the decay of the Roman Empire and the stagnation of Greek thought the progress of medicine came to a standstill, and it remained in a state of stagnation through most of the Middle Ages. The Byzantine period added little to medical knowledge, nor was the period of conquest and conversion by the Moslems productive of medical advance.

Though many of the European universities were formed in the twelfth, thirteenth, and fourteenth centuries, and despite the growth of the Christian virtue of compassion, resulting in many hospitals being raised and the sick nursed, medical science made but slight advance through the Middle Ages, chiefly for two reasons. The first is that the strife of intellects was of a kind that tended to the suppression of all experimental science, and the second that, by the scholastic type of mind, craftsmanship was held in low esteem; hence surgery was separated from medicine and the physician ranked as a man of learning; the surgeon as a barber. This separation delayed progress, and it is not until the nineteenth century that we find the two ranked as equal. With the Renaissance the study of medicine shared in the general freedom from accepted authority, and progress began once more.

Four men stand out in the sixteenth century on account of their influence. Paracelsus, a Swiss, was an original medical thinker, and the precursor of chemical pharmacology and therapeutics. Vesalius, the most striking figure in European medicine after Galen and before Harvey, was of Flemish birth, but did most of his work in Italy, and laid the foundation of modern anatomy. Paré, a French surgeon, shares with Hunter and Lister the credit of raising surgery to its present level. Leonardo da Vinci, the artist, was also the greatest scientist of the Renaissance in Italy.

Medical practice during the Renaissance was still largely a combination of superstition, herb-doctoring, and quackery, and the influence of the great masters was seen more in the following seventeenth century, when there was considerable improvement in the practice of medicine,

and also great advance by individual scientific endeavour.

It was an age of great writers and great scientists, but the greatest name in seventeenth-century medicine is William Harvey. Born in Kent, he studied for four years in Padua, then returned to England, where, after years of study combined with practice, he discovered the circulation of the blood—the most important medical event since the days of Galen.

Throughout the seventeenth century all medical science advanced, but special advance was made in anatomy, physiology, chemistry, and ophthalmology. In the latter half of the century English medicine was dominated by Sydenham, the reviver of the Hippocratic methods, and a man of great personality and high personal honour. Following the advances of the seventeenth century, the eighteenth century appears as a period of calm, and as in other things so in medicine there was a tendency to formalism. It was an age of theories and of systems, and there were fewer great original workers. Of these the most notable were: Linnaeus, the great Swedish botanist; Galvani and Volta, who were the first workers in electricity; Priestley and Lavoisier, the two foremost chemists; John Hunter, the greatest surgeon of the century; and Jenner, his pupil, who introduced preventive inoculation against small pox. During the two previous centuries medicine owed much to the great scientists, and in the nineteenth century this is equally evident. Foremost among these are Darwin, Helmholtz, and Virchow, whose works have had far-reaching effect on medical advance since their day. In the second half of the nineteenth century surgical practice made rapid strides, due to the discovery of anaesthetics

first widely used by Simpson, of Edinburgh—and to the antiseptic principles of Lister, who applied the work of Pasteur, the founder of modern bacteriology. The discovery of X-rays toward the end of the century had immediate effect in greater accuracy, and opened up lines of treatment not yet fully developed.

The outstanding feature of twentieth-century medicine is the rapid development of its preventive side. There has been great increase in laws relating to public health, sanitation, the health of the industrial worker, and the widespread establishment of clinics to control tuberculosis and venereal disease, and for maternity and child welfare. The Insurance Act of Great Britain in 1911 has given greater opportunity for early treatment of the worker, and is the first step toward a national medical service. In line with these, much work has been done in regard to medical statistics, and in bacteriological research in the production of preventive inoculation, while of late years the study of

medical psychology has been widely developed. The discovery of radium by Madame Curie in the beginning of the century has opened up a new era which may prove as far-reaching in medical science as in chemistry. BIBLIOGRAPHY: F. H. Garrison, *History of Medicine*; R. W. Livingstone, *Legacy of Greece*; W. Osler, *Medicine*.

Medina, a city of Arabia, the terminus of the Hejaz Railway, and, as the burial-place of Mahomet, the second holiest of Mahommedan cities. It is about 125 miles north-east of Yembo, its port on the Red Sea. The principal attraction is the magnificent mosque containing the tomb of the Prophet and the burial-places of Omar and Abu Bekr. Medina was the scene of the Prophet's labours after the *Hijra* (Friday, 10th July, 622). Pop. about 40,000, rising greatly during the *Hajj*.

Mediterranean Sea (Lat. *Mare Internum*), the inland sea between Europe, Asia, and Africa, about 2200 miles long and 1200 miles in extreme breadth. It communicates on the west with the Atlantic Ocean by the Strait of Gibraltar, and on the north-east with the Black Sea through the Dardanelles, the Sea of Marmora, and the Bosphorus. It is divided, near its centre, into two distinct and not very unequal portions, an eastern and a western, the latter lying west of Italy, Sicily, and Cape Bon in Africa. The other important subdivisions are the Adriatic Sea and the Aegean Sea. The most important islands are Sardinia, Sicily, Corsica, and the Balearic Isles, in the west division; and Cyprus, Rhodes, Crete, the Ionian Isles, and Malta, in the east division. The principal rivers which discharge themselves directly into the Mediterranean are the Ebro, Rhône, Po, and Nile. Its greatest ascertained depth is about 14,000 feet, sounded between Malta and Crete. Owing to the very narrow channel which connects the Mediterranean with the main ocean, there is very little tide; though on parts of the African coast, &c., a rise of more than 6 feet sometimes occurs. The Mediterranean abounds with fish, and also furnishes the finest coral and sponges. It is a great highway of traffic.

Medlar, a tree of the genus *Mespilus*, the *M. germanica*, found wild in several parts of Central Europe, and cultivated for its fruit, which is remarkable for its acerbity when first gathered. It loses this acerbity after a few weeks' keeping.

Médoc, a wine-growing district of Western France, in the department of Gironde, producing some of the best varieties of red Bordeaux.

Medulla, or Marrow, in animals, the highly vascular connective tissue, interspersed with adipose or fat-cells, which fills up the hollow shafts or *medullary canals* of long bones, and is the chief blood-forming tissue of the body. It is responsible for the production of all the red

corpuscles of the blood in the adult, and it also gives rise to some of the white blood corpuscles. In the shafts of the long bones the marrow is of the white or yellow variety; whereas in the extremities of these bones and in such bones as the ribs the marrow is red and rich in blood-forming elements. The *medulla oblongata* is the upper enlarged continuation of the spinal cord, while the *medulla spinalis* is the spinal cord itself. In vegetable physiology the *medulla* is otherwise known as the *pith*. See *Botany*.

Medullary Rays, in botany, plates of parenchymatous tissue running inwards and outwards from the cambium through wood and bast. They form an important part of the living tissue of the wood, and also serve for storage. The 'silver grain' of oak and other wood is due to their presence.

Medusæ, the jelly-fishes or sea-nettles, a name given to exenterate animals of the class Hydrozoa, being free and oceanic forms, the most typical of which consist of a single *medusa* or swimming-bell, shaped like an umbrella with a straight handle. The mouth is situated at the end of the handle, and leads into a cavity communicating with a system of canals. The umbrella is fringed with tentacles, and bears other sense-organs. A number of the medusæ formerly believed to be distinct species have been shown to be really the free, generative buds of other Hydrozoa. See *Hydrozoa*; *Scyphozoa*; *Siphonophora*.

Med'way, a river of England, which flows in a winding course across Kent, past Tunbridge and Maidstone, to Rochester and Chatham, where it spreads out into a broad estuary, joining that of the Thames. It is navigable to Maidstone; length, 70 miles.

Meerane (mä'ra-ne), a town of Saxony, with manufactures of woollens and textiles. Pop. (1919), 21,930.

Meerschauum (mër'shum), a hydrous silicate of magnesium, consisting of about 61 per cent silica, 28 magnesia, and 11 water, occurring as a fine white compact clay, commonly in lumps. It is found in Europe, but more abundantly in Asia Minor, especially in the alluvium of Eski-Shehr, in the province of Brusa, where it is associated with magnesite. It is manufactured into tobacco-pipes.

Meerut, a division and district of the United Provinces, India. The division has an area of 11,194 sq. miles; pop. about 5,800,000. District area, 2344 sq. miles; pop. 1,520,000. Wheat, barley, and the sugar-cane are cultivated; about a quarter of the area is irrigated.

Meerut, a city of the United Provinces, India, between the Ganges and the Jumna. It was the scene of the first great outbreak among the sepoys (1857). Pop. about 116,227.



Megalichthys (-ik'this), a genus of fossil ganoid fishes found in the British coal-measures, characterized by smooth, but minutely punctured, enamelled scales, some of which have been found as large as 5 inches in diameter. The fish was about 4 feet long.

Megalo'nyx, a genus of large fossil edentate mammals, allied to the sloth, but adapted for a terrestrial instead of an arboreal life, found in the Pleistocene of North America.

Megalosau'rus, a fossil dinosaurian reptile found in Jurassic and Cretaceous strata. Its length has been estimated at between 40 and 50 feet. Its powerful, pointed, and treacherous teeth indicate its carnivorous habits, and it must have been one of the most formidable saurians. Its remains were first known from England, but it has now been traced into India and North America. The American *Allosaurus* is a closely related genus. The anterior limbs of the Megalosaurus were much reduced, and they walked habitually on the posterior pair only.

Megapo'dius, a genus of gallinaceous birds, type of the family Megapodidae, the best-known species of which is the Australian brush-turkey (*Cathartes lathamii*), a large bird remarkable for erecting large mounds, composed of earth, grass, and decayed leaves, in the centre of which it deposits its eggs, leaving them to be hatched by the heat of the fermenting vegetable mass. There are fifteen species of the type-genus indigenous to Australia and some of the islands of the Pacific, and possessing singular nesting habits.

Meg'aris, a small district or state of ancient Greece, partly in Northern Greece, partly on the Corinthian Isthmus. The only important town was Megara, situated a mile from the sea. It contained a Pelasgian citadel, called Caria, on a hill north-west of the city, with a temple to Demeter, called Megaron, from which the name of the town is supposed to be derived. Megaris had flourishing colonies at an early period, but afterwards became annexed to Attica.

Megasporæ. See *Heterosporæ*.

Megatherium, a fossil genus of edentate mammals, allied to the sloths, but having feet adapted for walking on the ground, found in the Pleistocene Pampas deposits of South America. It was about 8 feet high, and its body 12 to 18 feet long. Its teeth prove that it lived on vegetables, and its fore-feet, about a yard in length and armed with gigantic claws, show that roots were its chief food. Its remains are found throughout a very large part of South America, and it penetrated the southern part of North America.

Megiddo, a place in Palestine, in the plain of Esdraelon (q.v.). It has been identified with the Armageddon which is mentioned in Rev. xvi, 16, as the site of the battle of the

great day of God. During the European War it was captured by the British, 10th Sept., 1918.

Mehem'et Ali, Viceroy of Egypt, born at Kavala, in Macedonia, in 1769, died 1849. He entered the Turkish army, and served in Egypt against the French; rose rapidly in military and political importance; became pasha of Cairo, Alexandria, and subsequently of all Egypt. In 1811 he massacred the Mamelukes to the number of 470 in Cairo, and about 1200 over the country. He then commenced, by the orders of the Porte, a war of six years' duration against the Wahabites of Arabia, which was brought to a successful conclusion by his son Ibrahim, and secured him the possession of Hejaz. Ibrahim also aided in bringing a large part of the Sudan under Egyptian rule. By means of a vigorous domestic policy Mehmet reduced the finances to order; organized an army and a navy; stimulated agriculture, and encouraged manufactures. From 1824 to 1827 he assisted the Sultan in endeavouring to reduce the Morea, which led to the destruction of his fleet by the allied European powers at Navarino (1827). Subsequently he turned his arms against the Sultan, and in his efforts to secure dominion over Syria by armed invasion, he was so far successful (see *Ibrahim Pasha*) that the European powers had to interfere and compel him to sign a treaty in 1833 which gave him the hereditary pashalik of Egypt in lieu of Syria, Candia, and Hejaz. Cf. Sir C. A. Murray, *A Short Memoir of Mohammed Ali*.

Meiningen (mī'ning-en), a town of Germany, Republic of Thuringia, formerly the capital of the Duchy of Saxe-Meiningen; on the Werra. The castle of the former duke is of antiquarian interest. Pop. 17,000.

Meissen (mī'sen), an ancient town of Saxony, founded by Henry I between 922 and 933, 14 miles W.S.W. of Dresden, at the influx of the Trübsch into the Elbe. On a height above the town stands a Gothic cathedral, erected between 1200 and 1450, and an extensive castle in the late Gothic style, belonging to the fifteenth century, restored and decorated with frescoes. Porcelain (in the porcelain factory near the town) is the staple manufacture. Meissen is the see of an archbishop. Pop. (1919), 37,493.

Meissonier (mī-sōn-yā), Jean Louis Ernest, French painter, born in Lyons 1815, died in Paris 1901. He went to Paris in 1830; worked in the studio of Cogniet, and exhibited his first picture, *The Victors*, in 1834. Great accuracy of draughtsmanship, keen observation, and the sharp accentuation of the important note in the picture distinguish all his works. Amongst his pictures may be mentioned: *The Smoker* (1839); *La Partie des Boules* (1848); *Napoleon III at Solferino* (1864); *The Cavalry Charge* (1867).

sold for 150,000 francs; the picture entitled *1807* (1875), representing Napoleon I in the battle of Friedland, sold for 300,000 francs; *Le Guide* (1883); and *Jena* (1889).

Mekong, or **Cambodia**, the longest of all the Indo-Chinese rivers, rises in East Tibet, flows through Western China, touches Burma, separates Siam from French territory, and after intersecting the latter enters the China Sea by several mouths; length, 2700 miles.

Mela, Pomponius, a Roman geographer who flourished during the first century after Christ, and is the author of a treatise, *De Situ Orbis*, containing a concise view of the state of the world as known to the Romans.

Melampsora, a genus of parasitic Fungi, family Uredineæ (rusts), mainly infesting trees, especially conifers, poplars, and willows; most are heterecious. — Cf. W. B. Grove, *British Rust-fungi*.

Melanchthon (me-lungk'thon; Ger. me-langh'ton), Philipp, German reformer, born at Bretten, in the Palatinate, 16th Feb., 1497, died at Wittenberg 10th April, 1560. His father was an armourer, and his original German name was Schwarzerd, which he Grecized into Melanchthon, or Melanthon. Both names denote 'black earth'. After having studied at Pforzheim he removed to Heidelberg University, where he took his Bachelor's degree, and afterwards to Tübingen University, where he attained the degree of Master, and became a lecturer. In 1518, at the instigation of Luther and Reuchlin, he was invited by Frederick, Elector of Saxony, to fill the chair of Greek in the recently founded University of Wittenberg. In 1519 he accompanied Luther to Leipzig, in order to dispute with Dr. Eck, and in 1521 he published his famous *Locæ Communes*, an exposition of Protestant dogmatics, which ran through some sixty editions in his lifetime, and was followed by other influential writings, such as the *Epitome Doctrinæ Christianæ* (1524). There is no doubt that many of the plans carried out by the reformers were the result of Melanchthon's wise suggestions. His Greek scholarship was also of inestimable advantage to Luther in his work of translating the Bible. In 1530 Melanchthon was appointed to draw up the general *Confession* which was presented to the emperor at Augsburg (hence known as the *Augsburg Confession*), and he also wrote the *Apology* for it. Before Luther's death, in 1546, a certain difference of view developed itself between the two reformers, and after that event Melanchthon lost in some measure the confidence of a section of the Protestants, and was involved in painful controversies, being accused by one party of a too great leaning to Calvinism, by another of a similar leaning to Romanism. — **BIBLIOGRAPHY:**

A. Harnack, *Philipp Melanchthon*; G. Wilson, *Philipp Melanchthon*.

Melanconiales, a section of Fungi Imperfecti (see *Fungi*), distinguished by having their conidium-bearing branches (conidiophores) massed in layers but not enclosed in cavities. Representative genus: *Pestalozzia*.

Melane'sia, a division of Oceania (q.v.).

Mel'anite, a lime-iron variety of garnet, the more ferriferous type of andradite, of a velvet-black or greyish-black, occurring always in crystals of a dodecahedral form. See *Garnet*.

Mel'aphyre, a compact black or blackish-grey igneous rock, now recognized as resulting from the alteration of andesite or basalt through the hydration of the mineral silicates and general decay under processes of weathering.

Melastomaceæ, a large natural order of tropical and subtropical polypetalous dicotyledons, mostly shrubs or trees, easily recognizable by the three or five prominent veins in each leaf, and the peculiar horned stamens opening by apical pores. Species of *Centradenia*, *Heeria*, *Medinilla*, and *Tibouchina* are grown for their handsome pink or purple flowers.

Melba, Dame Nellie, Australian operatic singer, born at Burnley, Melbourne, 10th May, 1859. The daughter of David Mitchell, a Scotsman, she married Captain Armstrong in 1882, but adopted the professional name of Melba from the city of Melbourne. She studied under Marchesi, and made her début in opera at Brussels, in 1887, as Gilda in *Rigoletto*. She has since had a remarkably successful career, appearing in Paris, London, and New York. In 1918 she was created D.S.E.

Melbourne, William Lamb, Viscount, English statesman, born 15th March, 1770, died 24th Nov., 1848. Educated at Eton and Cambridge, he became a barrister, but relinquished the law and became member of Parliament for Leominster. During the ministry of Canning he was Secretary for Ireland; in 1830 he became Home Secretary in the Grey administration, and succeeded to the premiership when it was overthrown in 1834 on the Irish question. He continued to lead the Whig party with varying success until 1841, when he resigned and retired from public affairs. He is chiefly known for the tactful way in which he advised Queen Victoria on her accession in 1837.

Melbourne, a city of Australia, capital of Victoria, on the River Yarra. The city and its suburbs occupy an extensive area, which is mostly hilly or undulating, with the Yarra winding through it, the city proper, on the north bank of the Yarra, being the central and most important business part of the whole. Beyond the city proper are the far more extensive suburbs, such as Collingwood, North Melbourne,

Fitzroy, Carlton, Brunswick, Prahran, Richmond, Hawthorn, St. Kilda, &c. Among the public buildings are the Houses of Parliament, Government house, the treasury, the law-courts, the free library, containing over 300,000 volumes; the mint, the university, with an admirable museum attached; the Ormond Presbyterian College, and the Anglican and Roman Catholic cathedrals. There are several public parks, a botanical garden, and race-courses, including that of Flemington (Melbourne Cup). There is access to the centre of the city for vessels of considerable size by means of the River Yarra. The shipping trade is large, both in exports and imports, the chief of the former being wool, of the latter manufactured goods. By its railway systems Melbourne is connected with all the principal towns of the Australian continent. The chief industrial products are leather, clothing, furniture, flour, ales, cigars, ironware, and woollens. The first settlements on the site of Melbourne were made in 1835; it was incorporated in 1842, and became capital of Victoria in 1851. A Centennial International Exhibition was held in 1888 in celebration of the founding in 1788 of the Australian Colonies. The ground set apart for the Exhibition covered 43½ acres, and the buildings 35½ acres. The first Parliament of the Commonwealth of Australia was opened in the Exhibition building by the present king (George V), then Duke of Cornwall and York, on 5th May, 1901. Population of city, inclusive of suburbs (1920), 743,000.

Meleager, Greek poet and anthologist, flourished about 60 B.C. The exact dates of his birth and death are unknown. He was born in Gadara, in Syria, the scene of the casting out of the legion of devils. He was educated at Tyre, and eventually settled in the Island of Cos, where he died at a great age. The famous anthology which he collected and named *Stephanos* (Garland) contains one hundred and thirty-four poems of his own. Meleager's epigrams are beautifully finished and polished, but, owing to his Asiatic origin, they are exotic and fantastic rather than Greek. They are almost all love-poems, many of them being addressed to Heliodora. The epigram on her death is one of the most graceful of Greek epigrams. In his introductory poem Meleager calls his own poems, with exquisite aptness, "early white violets". His *Stephanos*, which is the basis of the *Greek Anthology*, includes epigrams of all periods. He mentions forty-eight poets by name as being represented in it; the work of many others, whom he does not name, is also there.

Meleager, in Greek mythology, the son of Ceneus, King of Calydon. He distinguished himself in the Argonautic expedition and more particularly at the Calydonian hunt, killed the boar,

and gave its skin as the highest token of regard to his beloved Atalanta. A celebrated marble statue of Meleager, found in 1500, is in the Vatican.

Melia, a small genus of trees, type of the nat. ord. *Meliaceae*, natives of tropical Asia and Australia. *M. Azadirachta*, the neem tree or margosa, is a native of the East Indies. Its bark yields a bitter used as a tonic, its seeds yield a valuable oil, and its trunk a tenacious gum. *M. Azedarach*, sometimes called *Persian lilac*, *pride of India*, and *bead tree*, is a native of the north of India, now cultivated in the United States, as well as in Southern Europe.

Meliaceae, a natural order of polypetalous dicotyledons, distinguished by their stamens being united into a tube.

Mellitite, a mineral calcium magnesium iron silicate, allied to idocrase, occurring in small tetragonal prisms in some exceptional types of igneous lavas poor in silica.

Melilla, a Spanish seaport on the Mediterranean seaboard of Morocco; the main entry to the Rif country. It is a Spanish 'military command', and has a military wireless station on the Telefunken system; range, 320 miles. Extensive harbour works and narrow-gauge railways have been constructed. Melilla passed to Spain in 1490. During a hill fight in July, 1921, the tribesmen inflicted a severe defeat on the Spanish troops. Melilla was the military and air force base of the Spanish troops operating against Raisuli during the 1922 campaign. Pop. 42,592.



Common Melilot (*Melilotus officinalis*)

Melilot (*Melilotus*), a genus of leguminous plants, sub-ord. *Papilionaceae*, differing from

the clovers in having racemose flowers. The common yellow melilot (*M. officinalis*) grows wild in woods, hedges, and neglected fields in Britain and most parts of Europe. White melilot (*M. vulgaris* or *leucantha*), common in some parts of Europe, has become naturalized in Britain. It has been recommended as a fodder plant under the names of *Cabul* and *Bokhara clover*.

Mellitite, or **Mellilitite**, honey-stone, a mineral of a honey-yellow or brownish colour, occurring in brown coal. It has the composition mellitic acid 45, alumina 15, and water 40 per cent.

Melobesia, a genus of Red Algae, family Corallinaceae. The thallus is heavily encrusted with lime, and forms stony or coral-like concretions on rocks, &c.

Melocactus, a genus of plants, nat. ord. Cactaceae, characterized by the flowers being produced in a hemispherical or cylindrical head at the top of the plant. The plants themselves consist of simple fleshy stems of a globular or conical form, with numerous prominent ribs armed with fascicles of stiff spines placed at regular distances.

Melodrama (Gr. *melos*, song, and *drama* play), a stage-play into which songs were introduced, and in which the action was accompanied by appropriate orchestral music. The word was first used in the opening decade of the nineteenth century. Originally a melodrama was an extension of the principle that 'nothing introduces you a heroine like soft music'. The emotional effect of music was used to obscure the deficiencies of plot and dialogue. In later use the term melodrama was applied to a play characterized by sensational incidents and violent appeals to the emotion. Tragedy has been defined as a sequence of incidents or events so presented as to emphasize with seriousness their causal relationship. Melodrama is inadequately motivated tragedy, which stops at nothing to gain its effect. Melodrama stands to tragedy as farce stands to comedy. It is usually what Stevenson calls "a delicate study in snow and ink". It has as a rule a painfully virtuous heroine, a strong, silent hero, and a determined villain with a blue chin and an over-grown cigar. Virtue invariably triumphs after many vicissitudes. There is very often a scene which involves elaborate stage-devices, such as an explosion or a railway accident. Melodrama in its palmy days was often spoken of as 'transpontine', because the London theatres which specialized in this form of entertainment were situated on the Surrey side of the Thames. An extremely clever skit upon transpontine melodrama is to be found in the Gilbert and Sullivan opera *Ruddigore*, or the *Witch's Curse*, which, like its model, errs gravely in the direction of unnecessary extravagance.

Melon (*Cucumis Melo*), a well-known plant and fruit of the nat. ord. Cucurbitaceae or gourds. It is an herbaceous, succulent, climbing or trailing annual, cultivated for its fruit in hot Eastern countries from time immemorial. There are many varieties, as the Canteloup, which is reckoned the best, Egyptian, Salonica, Persian, &c. In Britain the melon, to be raised to perfection, requires the aid of artificial heat and glass throughout every stage of its culture. The *water-melon* (*C. Citrullus*) is much cultivated in the warmer parts of the world on account of its refreshing juice, which, however, is less sweet than that of the common melon. The *musk-melon* is a variety of *Cucumis Melo*.

Melpomene (mel-pom'e-nè), the muse who presides over tragedy, daughter of Zeus and Mnemosyne. She is generally represented as a young woman, with vine leaves surrounding her head, and holding in her hand a tragic mask.

Melrose, a town of Roxburghshire, Scotland, on the Tweed. Melrose Abbey, founded by David I in 1136, destroyed by Edward II (1322), and rebuilt by Bruce (1326), was partly demolished by the English in 1545. Sir Walter Scott describes it in imperishable lines in his *Lay of the Last Minstrel*. Abbotsoford, his home, is about 3 miles from Melrose Abbey. In 1918 the abbey was presented to the nation by the Duke of Buccleuch; a heart found in a leaden casket during excavations (1921) is believed to be that of Robert the Bruce. Pop. (1921), 4536.

Melting-point. The temperature at which a solid becomes liquid. This temperature may be determined by the ordinary mercury thermometer when it lies within the range of the instrument. For a wide range of temperatures the thermo-electric pyrometer is convenient; this consists of a platinum and platinum-iridium thermocouple electrically connected to a moving-coil galvanometer which has been calibrated to read temperatures by the use of standard fixed points or melting-point temperatures which have been determined by means of the gas thermometer. For very high temperatures the radiation pyrometer has been employed. (See *Freezing*; *Pyrometer*.)

Melton-Mowbray, a town of Leicestershire, England, at the junction of the Eye and Wreak Rivers; served by the London & North Western and Great Northern joint line, and Midland Railways. It is famous for pork-pies and Stilton cheese, and is a hunting centre. Pop. (1921), 9187.

Melville, Andrew, a Scottish reformer, born near Montrose 1545, died at Sedan 1622. He was educated at St. Andrews; studied at the University of Paris, 1564-6; became a professor at Poitiers, and afterwards at Geneva; returned to Scotland in 1574, where he was appointed

successively principal of Glasgow and of St. Andrews Universities. After doing much to give Scottish presbyterianism its special character, he was accused of sedition and contempt of court, but escaped prison by going into England (1584). Returning in 1585, he resumed his duties at St. Andrews, and became Moderator of the General Assembly in 1587, 1589, 1594. In 1600 he was summoned to London by the king to confer on Church matters, but because of his outspokenness he was committed to the Tower, and there remained until 1611. He then retired to France, and became professor in the University of Sedan.

Membrane, in anatomy, a texture of the animal body, arranged in the form of lamina, which covers organs, lines the interior of cavities, or takes part in the formation of the walls of canals or tubes. Membrane is generally divided into three kinds, mucous, serous, and fibrous. The lining of the nose, trachea, œsophagus, stomach, and intestines is of the first kind; the serous membranes form the lining of the sacs or closed cavities, as of the chest, abdomen, &c.; the fibrous membranes are tough, inelastic, and tendinous, such as the dura mater, the pericardium, and the capsules of joints.

Memel, a Baltic seaport and territory on the Kurisches Haff, formerly German, but ceded to the Allies by the Treaty of Versailles. Trade is the source of its prosperity, timber, grain, and fish being shipped. Shipbuilding and allied trades are carried on. Memel was founded by the Teutonic Order in 1252, became a member of the Hanseatic League, and has been sacked frequently by Russians and Swedes. During the European War it was taken and evacuated by the Russians (March 1915). The area of the territory is estimated at 1057 sq. miles. Pop. about 140,746. Pop. of the seaport, 32,000.

Memling, or **Memlinc**, Hans, a distinguished Flemish painter, born probably about 1430, died probably in 1465. He lived at Bruges, of which town he was a prosperous citizen, but little is known of his life. He was especially famous as a religious painter, and his works display a singular tenderness, ideality, and elevation. They are generally extremely well preserved.

Memnon, a Greek hero mentioned in the Homeric poems as the beautiful son of Eos (the morning), and in the post-Homeric accounts as the son of Tithonus and nephew of Priam, whom he assisted at the siege of Troy. He slew Antilochus, but was himself slain by Achilles. His mother was filled with grief at his death, which Zeus endeavoured to soothe by making her son immortal. The name of Memnon was afterwards connected with Egypt, and was attached to a statue still standing at Thebes, being one of two known from their size as 'the Colossi'. This

statue, known as 'the vocal Memnon', was celebrated in antiquity as emitting a sound every morning at the rising of the sun—perhaps through the craft of the priests, though some think it was owing to expansion caused by heat. Both statues seem originally to have been about 70 feet high.

Memory, a convenient word used to indicate collectively the mental processes involved in the recollection and presentation of past experience. The function of memorization is performed by the mind, and the theory of a *memory* as a separate faculty or department of the mind has long been discredited. It is in connection with the improvement of memory that the inquirer who is not a psychologist is most generally concerned, and such a faculty being non-existent, efficient memorization is dependent wholly upon improved methods of learning and of systematic remembering. A fundamental principle of memorization in any subject is that it must be understood, while the pre-existence within the mind of other associated past experiences, an organized body of learning, is of material assistance in a rapid and effectual assimilation of the new matter, and aids in fixing it as a part of the mental organization. Concentration or attention is essential to rapid memorization, and the ability to concentrate improves greatly with practice, although enthusiasm for the object of study or a mere interest in learning frequently provides all the external stimulus that is required. Improvement in memory is synonymous with improved methods of learning. A common example of faulty method is that known as the *part* method of learning, for instance, a lengthy passage from Shakespeare, whereby the selected passage is divided into sections, each being mastered at one sitting, and combined with the other sections as they are memorized. Empirical psychology has proved the inutility of this method, and it has fully been demonstrated that an easier and more effectual method of memorizing lengthy passages consists in the repetition of the entire passage from beginning to end until it shall have been completely mastered. See *Association of Ideas; Mnemonics*.—Cf. H. J. Watts, *The Economy and Training of Memory*.

Memphis, an ancient city of Egypt, on the left bank of the Nile, some 20 miles south of Cairo, said to have been founded by Menes, the first king of Egypt. It was a large, rich, splendid city, and after the fall of Thebes, the capital of Egypt. At the time of the conquest of Egypt by Cambyses (524 B.C.) it was the chief commercial centre of the country, and was connected by canals with the Lakes of Maria and Marcotis. With the rise of Alexandria the importance of Memphis declined, and it was finally destroyed by the Arabs in the seventh century. The

pyramids of Sakkara and the colossal statue of Rameses II, now mutilated and thrown down, are the chief objects of antiquarian interest on the site.

Memphis, the largest and most important commercial city of Tennessee, United States; county seat of Shelby county, and a river-port on the Mississippi. It is a distributing-point for cotton and live-stock, and has manufactures of cotton-seed oil and cotton-cake, flour, and tobacco. The town was settled in 1810 on the site of a fort built in 1739. It became a city in 1849. Pop. (1920), 102,351.

Menai Strait, the channel separating Anglesey from the mainland (Carnarvonshire). It is 14 miles long and from $\frac{1}{2}$ to 2 miles wide. See *Bridge*.

Menam', the chief river of Siam, rising in the Laos country, and flowing generally southward to enter the Gulf of Siam 25 miles below Bangkok; length, about 900 miles.

Menander, Greek comic dramatist, was born in 342 B.C., and died in 291 B.C. His parents were rich, and, as far as we know, Menander lived the life of a man of fashion in Athens. He was a friend of Theophrastus, and was patronized by Ptolemy Sôter. According to a scholium on Ovid's *Ibis*, he was drowned while bathing.

Menander is said to have written over a hundred comedies, and to have gained the prize only eight times. He became the favourite writer of antiquity, and it is not uncommon to find critics of the ancient world (e.g. Plutarch) speaking of him in terms that we would reserve for Shakespeare alone. He added many maxims and quotations to everyday speech, such as "Whom the gods love die young" and "Evil communications corrupt good manners" (quoted by St. Paul, *1 Cor.* xv, 33). To his sententiousness and quotability he probably owed a considerable amount of his fame. Until the end of last century we only possessed about 1650 fragments of Menander, mostly single lines or parts of single lines. These lines were mostly of a gnomic nature. However, in 1897 we got eighty lines of his *Farmer*, in 1899 and 1906 and later some three hundred lines of his *Lady with the Shorn Locks*, and in 1906 three hundred and forty lines of *The Samian Woman*, and five hundred lines of *The Litigants*. While there is something unsatisfactory about fragments, it is good to have even these scanty remains, and we have sufficient to enable us to form some idea of Menander's gifts as a comic writer. His great reputation, as far as we can tell, seems somewhat undeserved. The characters are all stock types, the situations conventional, and the plots of a highly unoriginal nature. Menander must have shone less as a dramatist than as a stylist; in his pure and elegant diction he must have stood high. In the plays of Terence, whom Julius

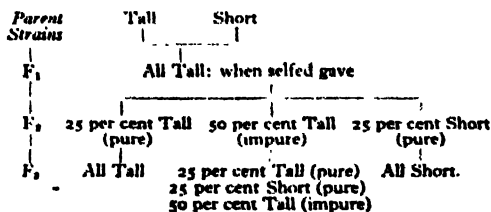
Cæsar called "half a Menander", we get some idea of the New Comedy as written by Menander.

Mencius, the Latinized name of Meng-tse, a Chinese teacher, who was born about 370 B.C., and died about 288 B.C. He was educated by his mother with such success that the approbation contained in the phrase 'the mother of Meng' has become proverbial. Mencius was one of the greatest of the early Confucians. Man's nature, according to Mencius, is good, although it may appear otherwise. Propriety, righteousness, and kindness are as natural to man as his four limbs.

Mendel, Gregor Johann, Austrian biologist, born 1822, died 1884. He became an inmate of the Augustinian monastery at Brunn in 1843, and abbot in 1860. He carried out experiments in his cloister garden on the laws of heredity in plants, and published an account of his results in 1866, but his work lay neglected until 1900, when several distinguished botanists independently called attention to its importance. *Mendelism* (q.v.) is the name given to the theory of heredity (q.v.) suggested by Mendel's work; its influence on present-day research and speculation in biology is hardly second even to that of Darwinism.

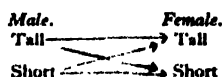
Mendeleëv (men-de-le-ey'f), Dmitri Ivanovitch, Russian chemist, born in 1834, became professor of chemistry at St. Petersburg (Petrograd) University in 1866, died in 1907, and was especially noted for his researches in the subject of the Periodic Law. His works include *Principles of Chemistry*, written in 1868-70, and translated into several languages. See *Chemistry*.

Mendellism, a theory of heredity (see *Mendel; Heredity*). Mendel's most important work was carried out with the edible pea (*Pisum sativum*), which is self-fertilizing, and exists in a number of distinct strains that breed true to type. He artificially crossed these strains, not in a haphazard way, but with the idea of studying the inheritance of obvious characters. For example, he crossed a tall strain (6 to 7 feet high) with a short strain ($\frac{1}{2}$ to $1\frac{1}{2}$ feet high), giving a first filial or hybrid generation (F_1), the further filial generations (F_2 , F_3 , &c.) being allowed to propagate themselves by selfing in the normal way. The results were as follows:



It will be seen that of the two opposing characters (Mendelian characters), tallness and shortness, the former was possessed by all the off-

spring of the first cross (F_1), and this was called the *dominant* character, the other being termed *recessive*. The members of the next generation can therefore be described as 25 per cent *pure dominants* (D) breeding true, 25 per cent *pure recessives* (R) also breeding true, and 50 per cent *impure dominants* (D(R)), in which the recessive character is present but masked. To explain these remarkable facts Mendel proposed a theory, known as the *segregation of pure gametes*, which is the essential part of Mendelism. Gametes are sex-cells, male and female, and a new individual (zygote) results from the fusion of a male gamete with a female gamete. A particular character, such as tallness or shortness, is supposed to be carried by a something (factor) present in a gamete, and according to the above theory any given gamete is 'pure', containing in this case either a tall factor or a short factor, but not both. When the first filial generation (F_1) is selfed, it is presumed that half the male gametes and half the female gametes are 'tall', and the other half 'short', and the chances of pairing between a male or female gamete with one of the same or different kind are equal, the possibilities being



uniting to give zygotes, which may be called tall-tall, short-tall, tall-short, and short-short. The first and last (25 per cent each) are *pure dominant* and *pure recessive* respectively, the two others (together 50 per cent) *impure dominant*. The zygotes that breed true are known as *homozygotes*, and those with a mixture of factors, which do not breed true, are termed *heterozygotes*. Opposed pairs of Mendelian characters, such as tallness and shortness, are conveniently designated *allelomorphs*.

So far we have considered *monohybrids*, or crosses with reference to one pair of *allelomorphs*, but Mendel also produced *dihybrids* by crossing strains differing in two ways. He found that in the seeds of pea roundness is dominant to wrinkledness, and yellow dominant to green, and that when a round green strain is crossed with a wrinkled yellow one, a shuffling of characters takes place, and an entirely new strain is produced, wrinkled green, that breeds true. It is also possible to work with three or more opposing pairs of opposed characters.

Examples of *allelomorphs* among plants are:

	Dominant.	Recessive.
Wheat	Absence of 'beard' or awn, Rough chaff, Red chaff, Keeled glumes, Plumy endosperm, Susceptibility to rust,	Presence of awn. Smooth chaff. White chaff. Rounded glumes. Floury endosperm. Immunity to rust.
Barley	Two-rowed ears,	Six-rowed ears.

The Mendelian theory also applies to animals, but here presents greater difficulties. The following are a few pairs of *allelomorphs*:

	Dominant.	Recessive.
Mice	Coloured coat,	Albino coat.
Rabbit	Coloured coat,	Albino coat.
Poultry	Rose comb,	Single comb.
Cattle	Hornlessness,	Horns.
Snails	Banded shell,	Banded shell.

It must not be supposed that all characters of plants and animals are due to the presence of single factors, for there is good evidence to show that some of them are brought about by the combined action of two or more factors. Among fowls, for example, there are various kinds of comb. The *rose comb* has a broad, irregular surface with a pointed projection at the back, while the small *pea comb* has two well-marked side ridges with a lower one between them. When a rose-combed breed is crossed with a pea-combed one, the offspring possess a *walnut comb*, shaped like half a walnut, and unlike either the pea or the rose.

We have seen that when tall and short peas are crossed, the 50 per cent impure dominant (heterozygous) tall exactly resemble the 25 per cent pure dominant (homozygous) tall in appearance, and only reveal their nature when they are allowed to breed. There are cases, however, where impure dominants can at once be recognized, the recessive character being less completely masked. The classical case is afforded by Andalusian poultry. When black Andalusians are crossed with splashed whites, the F_1 generation is blue, and in the next, or F_2 generation, we get 25 per cent pure black dominants, 25 per cent pure splashed white recessives, and 50 per cent impure dominants, which are blue in colour. This explains why fowls have never been able to raise a pure-breeding strain of blue Andalusians, for these are of mongrel constitution.

Mendelism has thrown much light on the phenomena of reversion, variation, and sex. As to the last, Bridges has shown that special sex chromosomes (see *Heredity; Mitosis*) exist, and that sex inheritance follows Mendelian laws. A series of brilliant researches have lately been carried out by Morgan and his colleagues in America—more particularly on the fruit-fly (*Drosophila ampelophila*)—in the endeavour to discover the physical basis of Mendelian 'factors', and a *chromosome theory* has been formulated as the result. According to this, a chromosome is a linear chain of factors, like a string of beads, and this gives a plausible explanation of the fact that characters are inherited in groups of varying size. Chromosomes are arranged in pairs, and it appears probable that the members of a pair can exchange one or more factors (*crossing-*

over or linkage), which renders a further series of facts intelligible.—BIBLIOGRAPHY: W. Bateson, *Mendel's Principles of Heredity*; R. C. Punnett, *Mendelism*; E. S. Goodrich, *The Evolution of Living Organisms*.

Mendel's Law. See *Mendelism*; *Heredity*.

Mendelssohn (men'delz-zōn), Moses, German philosopher, born of Jewish parents 1729, died 1786. In 1754 he formed a friendship with Lessing, who made him the hero of his *Nathan the Wise*, while he in turn defended his friend from the attacks of Jacobi, who accused Lessing of being a Spinozist. The chief works of Mendelssohn are a *Treatise on Metaphysics*; *Phædon*, a dialogue on immortality (1767); *Jerusalem* (1783); and *Morgenstunden* (1785).

Mendelssohn - Bartholdy, Felix, distinguished composer, born at Hamburg 3rd Feb., 1809, died at Leipzig 4th Nov., 1847. He was the son of a wealthy Jew, who, recognizing his son's talent for music, had him carefully trained. In his ninth year he publicly appeared in Berlin, and before he was eighteen years old produced the well-known overture to the *Midsummer Night's Dream*. In 1829 he began an extensive tour in England, Scotland, France, and Italy, and on his return to Germany he became musical director in Düsseldorf. Here he tried to establish a theatre but without success; and when he left that city in 1835 he became conductor of the famous concerts in the Gewandhaus of Leipzig—a position which he maintained with several slight interruptions until his death. In 1841 he was appointed musical director to the King of Saxony; was afterwards summoned to Berlin by the King of Prussia to become director of music at the Academy of Arts; journeyed repeatedly to England, where he conducted his own music at London and Birmingham. Of his musical compositions the best known are the oratorios *Elijah* and *St. Paul*; the overture to *Ruy Blas*; and his *Songs without Words*. He left unfinished the oratorio of *Christus* and the opera of *Lorelei*.—Cf. J. C. Hadden, *Life of Mendelssohn*.

Mendès (mān-dās), Catulle, French poet, novelist, and dramatist, born at Bordeaux, of Jewish parents, in 1841, died in 1909. He began his literary career in 1859, when at the age of eighteen he founded the *Revue Fantaisiste*. Among his poems may be mentioned: *Philomela* (1864), *Hesperus* (1869), *La Colère d'un franc-tireur* (1871), and *Poésies* (1885); among his novels, *Les Folies amoureuses* (1877), *Le Roi vierge* (1890), and *Le Chérin du cœur* (1896); whilst he has also written some historical works and several plays, including *La Part du Roi* (1879), *Justice* (1878), and *La Reine Flammette* (1898).

Mendo'za, Don Diego Hurtado de, a Spanish

author, general, and politician, born 1503, died 1575. He wrote an account of the Moorish insurrection in the Alpujarras Mountains, and is generally but erroneously considered to have been the author of the *Life of Lazarillo de Tormes*, the first of a class of novels descriptive of the life of clever rogues.

Mendoza, a western province of the Argentine Republic, traversed by the Andes on the west, but elsewhere a plain. Cattle, cereals, hides and wool, maize, fruit, and olives are raised and produced; gold, silver, lead, coal, copper, and petroleum are found. Area, 56,502 sq. miles; pop. (1920), 807,560. The capital, Mendoza, is the link town on the Transandine railway system. It was destroyed by earthquake (1861), and rebuilt a mile nearer the mountains. Pop. (1920), 58,800.

Menela'us, in Greek mythology, son of Atreus, brother of Agamemnon, and husband of the beautiful Helen, with whom he received the kingdom of Sparta or Lacedæmon. His wife having been abducted by Paris, son of Priam, King of Troy, he summoned the Greek princes to avenge the affront, and himself led sixty ships to the siege of Troy. After its conquest he returned with Helen to his native land in a devious voyage which led him to Cypria, Phœnicia, Egypt, and Libya during a period of eight years.

Menelik, or **Menelek II**, *Negus* or Emperor of Abyssinia (officially styled *negus negusti*, king of kings), born at Shoa 18th Aug., 1844, died at Addis Ababa 12th Dec., 1913. The son of the Crown Prince of Shoa, he claimed King Solomon and the Queen of Sheba as his ancestors. He established himself as King of Shoa in 1865, and ultimately became King of Abyssinia. In 1885 Italy threatened his independence, and in consequence of the Treaty of Ucciali in 1889 claimed a protectorate over Abyssinia. Menelik protested in 1893, and in 1896, by the victory of Adowa, he forced Italy to sign the peace of Addis Ababa. Italy received the colony of Eritrea, but Abyssinian independence was saved.

Menha'den, an American salt-water fish (*Alosa menhaden*). It belongs to the herring family (Clupeidae), and abounds on the shores of New England. It yields quantities of oil, the waste being used as manure. It is also preserved in the same way as the sardine.

Menin (mē-nān), a town of Belgium, province of West Flanders, on the Lys, with manufactures of lace and cotton. The town was captured by the Germans in Oct., 1914, and recovered by the Allies four years later (Oct., 1918). Pop. 21,000.

Meningitis is an inflammation of the membranes of the brain or spinal cord, due to in-

fection by germs. Four different types are recognized, and of these epidemic cerebro-spinal meningitis is described under cerebro-spinal meningitis (q.v.). The remaining three are: (1) septic meningitis, which arises from infection of wounds of the cranium, or through the nasal passages, or more rarely through the blood-stream from a septic focus in another organ of the body. The earliest symptoms are headache and general prostration, followed by feverishness. Vomiting and constipation are present at first, but later incontinence. The pulse is rapid, and the respirations are irregular (known as the cerebral type of breathing), while the mind is early clouded; this is followed by complete unconsciousness. Marked retraction of the neck, convulsions, spasms, and squint are frequently present. Septic meningitis is very fatal and recovery rare. (2) Serous meningitis, due to serous inflammation within the membranes, as a result of some septic focus outside the skull. The symptoms are similar to those of septic meningitis, but less severe, and they may subside if the septic focus is located and removed. (3) Tuberculous meningitis arises from infection of the membranes, due to tuberculous disease in a gland or bone. It is most frequent in young children, and has a slow and insidious onset. The child is listless, complains of headache, and soon vomiting begins. After being drowsy for about two weeks the child gradually becomes comatose. The disease lasts from six to eight weeks, and is nearly always fatal.

Menispermaceæ, an extensive natural order of polypetalous dicotyledons, consisting of twining, often scrambling and slender, shrubby plants, with alternate leaves without stipules, and small greenish or white unisexual flowers. They are common in the tropical parts of Asia and America, and are usually bitter and tonic plants, the seeds of some of them having narcotic properties. One species yields cocculus indicus.

Menno, Simons, the founder of the sect known as the Mennonites, was born in Friesland 1496, died 1561. He was educated for the Church, and became a Roman Catholic priest; but about 1580 he joined the Anabaptists. He founded a sect of his own, and there are still a number of congregations in Holland, Germany, and Russia who pass under the name of Mennonites. These do not believe in original sin, and object to taking oaths, making war, or going to law. The Mennonites are also found in the United States. See *Anabaptists*.

Menobran'chus. See *Necturus*.

Men'opome, or **Menopo'ma**, a tailed amphibian, the 'hellbender' (*Menopoma alleghaniensis*), peculiar to the fresh waters of North America, which seems to form a connecting link between

the perennibranchiate amphibians and the salamander. The Giant Salamander (*Cryptobranchus japonicus*) of China and Japan is closely related.

Menstruation, or **Menses**, the periodical discharge of blood-stained material from the generative organs of the human or Simian female. As an ovum ripens, the mucous membrane lining the womb grows rapidly to provide a fresh bed of new cells in which the ovum, if it becomes fertilized, can become implanted. If the ovum is not fertilized, the overgrown mucous membrane is shed together with a certain amount of blood that escapes from the severed blood vessels. The period at which menstruation begins is usually between the fourteenth and sixteenth year; it recurs at monthly intervals, lasting for four to six days, and thus continues until from the forty-fifth to the fiftieth year; the discharge at each period is from 6 to 8 oz. All these conditions, however, vary with each individual. A discontinuance of this discharge is one of the first signs of conception, and the cessation usually continues during the period of pregnancy and lactation.

Mensuration, the branch of mathematics which deals with the measurement of lengths, areas, and volumes. The following are the more important formulæ. Area of triangle = $\frac{1}{2}$ base \times height; or = $\sqrt{s(s-a)(s-b)(s-c)}$, where a, b, c are the sides, and $s = \frac{1}{2}(a+b+c)$; or = $\frac{1}{2}bc \sin A$. Area of parallelogram = base \times height = $bc \sin A$. Area of trapezium = $\frac{1}{2}$ sum of parallel sides \times perpendicular distance between them. Circle (q.v.): circumference = $2\pi r$; area = πr^2 ; area of sector = $\frac{1}{2}\theta r^2$, where θ = angle of sector, r = radius. Area of ellipse = πab , where a, b are the semi-axes. Cylinder or prism: volume = area of base \times height; surface = perimeter of base \times height + area of ends. Cone or pyramid: volume = $\frac{1}{3}$ area of base \times height; curved surface of cone = $\frac{1}{2}$ perimeter of base \times slant side. Sphere: volume = $\frac{4}{3}\pi r^3$; surface = $4\pi r^2$; surface of any zone = $2\pi r \times$ height of zone; volume of zone between a great circle and a parallel small circle = $\pi(r^2z - \frac{1}{3}z^3)$, where z = height of zone. The general problem of finding lengths, areas, and volumes belongs to the integral calculus (see *Calculus*). For a very useful approximate method, see *Simpson's Rule*. For mechanical methods, see *Planimeter*.

Menthol ($C_{10}H_{18}O$), peppermint camphor, a white crystalline substance obtained from mint (genus *Mentha*), of which it smells strongly; used externally in cases of nervous headache.

Mentone (Fr. *Menton*), a Riviera town and winter-resort, Alpes-Maritimes, France, on the Mediterranean. The climate is equable and very mild. In the neighbourhood there are many

groves of oranges and lemons. The town was purchased by France from the Prince of Monaco in 1861. Pop. about 18,000.

Menzaleh, or Menzala, a lagoon of Egypt extending from the Damietta branch of the Nile to the Suez Canal, which traverses its eastern side. It runs parallel with the Mediterranean, from which it is separated by a narrow sandspit pierced by three openings, and containing several villages and Port Saïd. It provides fish and salt. Area, about 450 sq. miles.

Mephistoph'eles (older forms *Mephistophilus*, *Mephistophills*), the name of a demon in the old puppet-plays, adopted and developed by Marlowe in his tragical history of *Dr. Faustus*; and more especially by Goethe in the first part of *Faust*, where he becomes the cultured personification of evil rather than the Satan of popular belief.

Mequinez, or Meknès, a city of Morocco, on the Atlantic slopes of the Atlas range, in the French zone of influence, and a military area of the Sherifian army. There are vineyards in the vicinity. Pop. (1919), 37,247 (2202 Europeans).

Mercantile Law, in England, the law regulating dealings between merchants, i.e. commercial law (Lat. *merc.*, *merchandise*). It is built up in greater part of the customs and usages of traders (the law merchant), and includes the law of negotiable instruments, the sale of goods, partnership, agency (brokers, factors, warehousemen, and others), carriage (charter-parties, bills of lading, &c.), insurance, patents, trade-marks, &c. Any custom which is against commercial morality is not binding and cannot be founded on.

Mercantile Marine. The British merchant service had its origin in the fleet built by King Alfred to protect England from the ravages of Danish pirates. He copied but improved on the Danish ships, and at first manned his vessels with sea-rovers of Frisia; but ultimately his own Englishmen learned the art of seamanship, and, having become proficient navigators by necessity, they saw no reason why they should not continue to be seamen when that necessity had been removed. In this manner the mercantile marine was founded, and with it the nation's prosperity, of which British supremacy at sea is still the basis.

The following table gives the losses of the Allies from enemy action during the European War, 1914-8.

Britain	2107 vessels, 7,638,020 tons.
France	238 " 698,845 "
Italy	230 " 742,365 "
Japan	20 " 120,176 "
United States	30 " 341,512 "

On 30th June, 1921, there were 11,433 vessels

over 100 tons showing the British flag, including 10,324 steam-vessels of 21,588,606 tons, and 1109 sail-vessels of 482,192 tons. The world's total on the same date showed steam-vessels, 58,846, 325 tons, and sail-vessels, 3,128,328 tons. In 1914 there were 205,652 seamen employed in British ships, including fishing-craft, but exclusive of river and inland navigation vessels. 212,640 of the total were British, 81,396 were European foreigners, and 51,616 were *Lascars* and *Asiatics*. Among European foreigners employed were: Germans, 5000; Swedes, 3000; Norwegians, 2150; Russians, 2000. Much information regarding officers, men, and tonnage will be found under *Shipping*.

Mercator, Gerard, mathematician and geographer, born at Rupelmonde, in Flanders, 1512, died 1594. He studied at Louvain; became a lecturer on geography and astronomy; entered the service of Charles V, for whose use he made a celestial and a terrestrial globe; and in 1552 retired to Duisburg, on being appointed cosmographer to the Duke of Juliers (1559). He is the author of a method of projection called by his name, the principles of which were applied practically by Edward Wright in 1599. He is also the author of *Tabule Geographicae* (Cologne, 1578).

Mercator's Projection. See *Maps*.

Merchandise Marks Act, passed in 1887, provides that all goods of foreign manufacture bearing any name or trade-mark of any manufacturer, dealer, or trader in the United Kingdom (unless such goods are accompanied by a definite declaration of the country in which they were produced) are prohibited under penalties from being imported into the United Kingdom; while under an amending Act of 1911 the importer of such goods may be required to produce any documents in his possession relating thereto, and to furnish the names and addresses of the consignor and consignee, and such information may be communicated to the person whose name or trade-mark has been infringed. All such goods are forfeitable. Under the Act, one who falsely represents that he is the maker of goods for the king, the royal family, or Government is liable in a penalty of £20. It is also an offence to forge any trade-mark, to apply to goods any false trade description or any mark so nearly resembling a trade-mark as to be calculated to deceive, to sell or expose for sale any goods with such a trade-mark or trade description, and to make, possess, or dispose of any die, &c., for the purpose of forging a trade-mark.

Merchant Shipping Acts. See *Shipping*.

Mercia, the largest of the Anglo-Saxon kingdoms, comprehended all the middle counties of England; and was founded by Crida in 585. In 827 it was conquered by Egbert, who united

the different kingdoms of England into one. After this time it was repeatedly overrun by the Danes. See *England*.

Mercury, in mythology, the name of a Roman god, identified in later times with the Greek *Hermès*. As representing *Hermès* he was regarded as the son of Jupiter and Maia, and was looked upon as the god of eloquence, of commerce, and of robbers. He was also the messenger, herald, and ambassador of Jupiter. As a Roman god he was merely the patron of commerce and gain.

Mercury, in astronomy, the planet nearest the sun. It moves round the sun in 87·9693 of our mean solar days, at a mean distance of 35,960,000 miles; its eccentricity of orbit is 0·203618; the inclination of its orbit to the ecliptic is 7°0'8"; its diameter is about 3050 miles. The period of its axial rotation is uncertain, but is believed by many astronomers to be the same as that of its revolution round the sun. The volume is about $\frac{1}{7}$ that of the earth; the density about $\frac{1}{4}$ less than the earth's. Mercury is most conveniently placed for observation by the naked eye when an evening star in spring or when a morning star in autumn. Transits of the planet across the sun's disc are not infrequent. They can occur only near 7th May or 9th Nov., on account of the position of the nodes of the orbit.

Mercury, called also quicksilver, symbol Hg, atomic weight 200·6 (see *Isotopes*), a metal whose specific gravity is greater than that of any other metal, except the platinum metals, gold, and tungsten, being 13·56, or thirteen and a half times as heavy as water. It is the only metal which is liquid at common temperatures. It freezes at -38·8° C., and boils at 356·7° C. When heated in the presence of air it is gradually converted into a red oxide. Mercury is used in barometers to ascertain the pressure of the atmosphere, and in thermometers used to determine temperature, for which purpose it is well adapted by its expansibility and the extensive range between its freezing- and boiling-point. Preparations of this metal are among the most powerful poisons, and are extensively used as medicines. The preparation called calomel or mercurous chloride (HgCl) is a most efficacious deobstruent. Another valuable preparation is corrosive sublimate or mercuric chloride (HgCl_2). Mercury combines with or dissolves other metals, e.g. gold, silver, tin, forming amalgams; and these metals should therefore not be brought into contact with it. Amalgams are, however, largely used in certain industries, and especially by dentists for stopping teeth. Mercury is chiefly found in the state of sulphide, *cinnabar* (HgS), but it is also found native. The chief mines are in Spain, Italy,

California, Mexico, and Peru. The metal is readily extracted from its ores by simply roasting them in suitable furnaces. During this roasting operation the sulphur is eliminated as sulphur dioxide gas, and the metallic mercury, being at a temperature above its boiling-point, is distilled off and passes forward with the furnace gases, from which it is condensed and collected by passing through suitable coolers. This process, or a modification of it, has been in use at the great Almaden mines in Spain for hundreds of years.

Meredith, George, British novelist and poet, was born 12th Feb., 1828, and died 18th May, 1900. His father, a naval outfitter at Portsmouth, was of Welsh extraction, and his mother had a strain of Irish blood in her. Meredith went as a day boy to St. Paul's Church school, Southsea, and at the age of fifteen he was sent to the Moravian school at Newfield, on the Rhine, where he remained nearly two years. On his return he was articled to a solicitor, and made many friends among literary people. Among them was Thomas Love Peacock (q.v.), whose widowed daughter, Mrs. Nicolls, Meredith married in 1840. He then abandoned law, and turned to journalism and literature for a livelihood. He wrote for *The Ipswich Journal*, *Once a Week*, and *The Morning Post*. His first published volume, *Poems*, appeared in 1851. His career as a novelist began with *The Shaving of Shagpat* (1856). His first marriage was a failure; his wife left him in 1858, and died in 1861. In 1864 he married Marie Vulliamy, with whom he had twenty-one years of happy married life. In 1862 he became literary adviser to Messrs. Chapman & Hall, and continued his connection with that publishing house for more than thirty years. *Errolton* and *Eust Lynne* were among the books upon which he reported adversely. During the Austro-Italian War of 1866 he acted as special correspondent for *The Morning Post*. There is little to record in the incidents of his life, apart from the appearance of his novels. In 1865 he took up his residence at Flint Cottage, Box Hill, and remained there until his death.

The Shaving of Shagpat (1856) and *Farina* (1857) were Meredith's two earliest novels. The former, which is decidedly the more successful, is based upon *The Arabian Nights*, and the latter, which is a legend of Cologne, upon the mediæval and romantic tale. Both these books contain a strong burlesque element; the latter was somewhat influenced by Meredith's father-in-law, Peacock. *The Ordeal of Richard Feverel* (1859) and *Evan Harrington* both contained richly farcical scenes in their original form. They were ruthlessly revised (and not improved) for later editions in 1878 and 1897. The revision made *Evan Harrington*, which was an excellent

farce centring round some thinly disguised members of the novelist's own family, a somewhat ill-proportioned comedy. *Emilia in England* (1864), afterwards re-christened *Sandra Belloni*, and its sequel *Vittoria* (1867) are written in his best manner, but were not well received. *Rhoda Fleming* (1865), a powerful story, deals with the yeoman class. *The Adventures of Harry Richmond* (1871) is a brilliant first-person romance; *Beauchamp's Career* (1874) was its author's favourite among all the novels. *The Egoist* (1879) is by many considered Meredith's masterpiece; he certainly wrote it primarily to please himself, and it therefore contains the quintessence of his philosophy of life. *The Tragic Comedians* (1880) is a much less elaborate novel founded on fact. *Diana of the Crossways* (1885) was the first of his novels to be widely read by the general public. Its popularity was largely due to the fact that its heroine was modelled upon Caroline Sheridan, the Hon. Mrs. Norton, and its central incident was based upon a widespread but erroneous story that Mrs. Norton had betrayed a Cabinet secret to *The Times*. *One of Our Conquerors* (1891) is one of the most obscure of the series, and was called by its author "a strong dose of my most indigestible production". *Lord Ormont and his Aminta* (1894) and *The Amazing Marriage* (1895) were the last of his novels. *Cell and Saxon*, an unfinished early novel, was posthumously published in 1910.

About Meredith's position as a novelist there can be no two opinions. He stands in the front rank, with one or two others. Yet he has never been widely popular, but remains the favourite of 'an honourable minority'. His enemies have charged him with fantastic foppery of expression, with shun profundity, and with having an oracular air of superiority. His novels are certainly not always easy reading, but their difficulty has been much exaggerated. Some of his obscurity was due to the spirit of mischief. When he chose, he could write crisply and clearly. He is not liked by those who read novels merely for the plot. It is in character-drawing, especially in portraying women, and in describing the manifold variety of nature that he excels. He is the most intellectual of the Victorians. Much light is thrown on his theory of art by his *Essay on Comedy and the Uses of the Comic Spirit*, which was a lecture delivered at the London Institution, 1st Feb., 1877. There he dwells on the uses of the Comic Spirit, which arouses thoughtful laughter, prevents us from taking ourselves too seriously, and destroys the bugbear of sentimentalism.

As a poet Meredith does not rank so high, though *Love in the Valley*, *Modern Love*, and some of his shorter poems are haunting and melodious, in spite of their occasional obscurity.

During the last years of his life Meredith was generally recognized as the most prominent man-of-letters in England. He was chosen to succeed Tennyson as president of the Authors' Society; he held the gold medal of the Royal Society of Literature; and he was given the Order of Merit in 1905.—BIBLIOGRAPHY: R. Le Gallienne, *George Meredith: some Characteristics*; G. M. Trevelyan, *The Poetry and Philosophy of George Meredith*; J. Moffatt, *George Meredith: a Primer to the Novels*; C. Photiades, *George Meredith: his Life, Genius, and Teaching* (translated by A. Price); S. M. Ellis, *George Meredith: his Life and Friends in Relation to his Work*.

Merganser, a genus of aquatic birds belonging to the duck family. The red-breasted merganser (*Mergus serrator*) and the goosander



Red-breasted Merganser (*Mergus serrator*)

(*M. merganser*) are the commonest British species, which range from the Bermudas to China and Japan. The smew (*M. albellus*) is native to the northern part of the Old World, wintering in Britain, the Mediterranean, Northern India, China, and Japan. There are two North American species, *M. americanus* and the hooded merganser (*Lophodytes cucullatus*). Mergansers inhabit lakes and the sea-coast, migrate southward in winter, lay from eight to fourteen eggs, and are gregarious in habit.

Mérída (ancient Augusta Emerita), a dilapidated city of Badajoz, Spain, on the Guadiana. Founded by the Romans (23 B.C.), Augusta Emerita became capital of Lusitania. It fell to the Moors under Musa (713), and was retaken by Alfonso IX of Leon in 1223. The Roman remains (forum, bridge built by Trajan, amphitheatre, circus, and aqueduct) are outside the modern town, and are the most important in Spain.

Mérída, capital city of Yucatan, Mexico, 25 miles inland from the port of Progreso, on the

Mexican Gulf, with which it is connected by railway. It was founded in 1542; the cathedral dates from 1508. Pop. 62,430.

Mérida, a state of Venezuela, created in 1901. Area, 4000 sq. miles; pop. (1918), 117,142. The state capital is Mérida (founded 1558), on the Chama. It is the seat of the University of Los Andes. Pop. 13,400.

* Meriden, a town of Connecticut, United States, in New Haven county. Silver-ware, glass, and fire-arms are among its manufactures. Pop. (1920), 84,764.

Meridian, a line imagined as described upon the earth's surface so as to pass through a given place and the two poles. It is therefore one-half of a great circle, if we assume that the earth is spherical. The plane of a meridian will evidently pass through the earth's axis, and be perpendicular to the equator. This plane, extended outwards from the earth, will intersect the imaginary celestial sphere which astronomers picture as surrounding the earth, the intersection constituting the celestial meridian. The celestial meridian of a place thus passes through the zenith of the place, and the north and south points of the horizon. Each star, as well as the sun, crosses the meridian twice daily, though, except for the *circumpolar stars*, one transit occurs beneath the horizon. We say that the body crosses the meridian. At the moment of upper transit it is either due south or due north, unless exactly overhead. In reality, of course, it is the moving plane of the meridian that crosses the sun's or star's disc, being carried round by the earth's rotation. The name meridian is derived from Latin *meridianus* (from *medius*, middle, and *diēs*, day), because the sun's crossing the meridian marks midday. All places situated on the same meridian have the same local time, and midday at the same instant, but the times of sunrise and sunset, and consequently the lengths of the day, differ with the latitudes of the places, except at the vernal and autumnal equinoxes. See *Day*; *Latitude*; *Longitude*.

Meridian Circle. See *Transit Circle*.

Mérimée (mā-ri-mā), Prosper, French poet and prose writer, born 28th Sept., 1803, died 28th Sept., 1870. He studied law and passed advocate; but employed himself more with literature, and first came prominently forward in 1825 with eight comedies professedly translated from the Spanish of 'Clara Gazul'. He contributed to the *Revue de Paris* and the *Revue des Deux Mondes*; became inspector of historical monuments, in which capacity he travelled through France, and wrote several archaeological works. He continued to publish romantic tales, such as *Arsène Guillot*, *Carmen*, *Colomba*, *Mateo Falcone*, &c.; was made a Senator in 1853, and

grand officer of the Legion of Honour in 1866. Among his writings are: *The History of Don Pedro I of Castile* (1843), *Poetry of Modern Greece* (1855), *Lettres à une inconnue* (1873), and *Travels in various parts of France*.—Cf. G. Saintsbury, *Writings of Prosper Mérimée*.

Merino (me-rē'nō) is a short fine-stapled wool, very rank and wavy, and derives its name, from a type of Spanish sheep. Very fine wools from other countries often receive the same name, which always indicates a wool of very good quality, and from which high counts (very thin yarns) can be spun. Botany wool, the original of which came from Australia, and was shipped



Australian Merino Ram



Spanish Merino Ewe.

from Botany Bay, is of the same quality. The term merino is also applied to high-grade fabrics made from merino or Botany yarns. French merinos, for example, were at one time largely made from such fine wools, woven with twill weave, dyed in all shades, and used extensively for ladies' dresses. The chief British seat for these goods is Bradford, Yorkshire, but they are also made in several other districts in the United Kingdom.

Merioneth, or Merionethshire, a maritime county of North Wales, served by the Great Western, Cambrian, and London & North Western Railways. The coast-line is broken and rugged; the surface of the county mountainous (Aran Mawddwy, 2970 feet; Cader Idris, 2927 feet); the chief rivers the Dee, the Mawddach, the Dovey; and the largest lake Tegid or Bala Lake (largest in Wales). Slate, limestone, and manganese are worked. The soil is for the most part poor, oats being the chief grain crop; cattle, sheep, and small hardy ponies are reared. Merioneth returns one member to Parliament. Chief town, Dolgelly. Area, 422,372 acres; pop. (1921), 45,450.

Meristem, a group, layer, or mass of cells capable of continued division. The principal types are: (1) primary meristems, such as the of embryonic cells forming the apex

('growing-point') of root and shoot in seed-plants; these produce all the cells that subsequently by growth and differentiation give rise to the various 'permanent' tissues; (2) secondary meristems, such as the *cambium* and *phellogen* (q.v.).

Merle d'Aubigné (merl dô-bên-yâ), Jean Henri, historian and theologian, born at Geneva 1704, died 1872. His education, commenced at Geneva, was completed at Berlin. He became pastor at Hamburg to a French congregation, and removed afterwards to Brussels. Returning to his native city in 1830, he became professor of Church history in the theological school founded by the Genevan Evangelical Society. Besides his well-known *History of the Reformation in the 16th Century* (1835-53), he published a supplementary history to the time of Calvin (Paris, 1862-8); *The Protector* (Cromwell), 1847; and the *Recollections of a Swiss Minister*.

Merlin, a legendary Welsh prophet and magician, who is said to have lived in the fifth century. He is said to have been the offspring of a demon and a Welsh princess, and became adviser to the English kings Vortigern, Ambrosius, Utherpendragon, and Arthur. There was also a prophet connected with the ancient kingdom of Strathclyde called *Merlin the Wild*, or *Merlinus Caledonius*, who is said to have lived in the sixth century. His prophecies, containing also those ascribed to the Welsh Merlin, were published at Edinburgh in 1615.

Merlin, or **Stone Falcon** (*-Esalon regulus*), the smallest of the British falcons, being only about the size of a blackbird, but very bold. It was formerly used in hawking quails, partridges, larks, and such small game, and is even yet occasionally trained. It is of a bluish-ash colour above, reddish-yellow on the breast and belly, with longitudinal dark spots; the throat of the adult male is white. It builds its nest on the ground.

Mermaid's Purse, a name given to the horny egg-case of the skate, spotted dog-fish (q.v.), &c., which is often thrown up on the shore.

Meroë, a city and state of ancient Ethiopia, in the north-eastern part of Africa, corresponding mainly with the district between the Nile and Atbara, north of Abyssinia. Meroë was the centre of the caravan trade between Ethiopia, Egypt, Arabia, Northern Africa, and India. There are pyramids at the site of ancient Meroë, and a small town of same name on the Nile.

Merostomata, a group of arthropods, represented by the living king-crab, the extinct members of which are important in the fauna of late Silurian, and especially of Devonian times. The division Eurypterida includes forms

up to 6 feet long, and their remains are well known in the Scottish Old Red Sandstone.

Merovingians, the first dynasty of Frankish kings which ruled in the northern part of Gaul from 496 to 752, when they were supplanted by the Carolingians. They derived their name from Merwig or Merowig (Merovæus), the grandfather of Clovis.

Merrimac, a river of the United States flowing through New Hampshire and Massachusetts. The immense water-power furnished by its falls has created the towns of Lowell and Lawrence in Massachusetts, and of Nashua and Manchester in New Hampshire.

Merseburg (mer'zê-burg), a town of Prussian Saxony, on the Saale. It is walled, has a seventeenth-century castle used as Government offices, and a cathedral dating from the eleventh century. Pop. 21,000.

Mersey, a river and commercial highway of England, has its origin in Derbyshire by the junction of the Goyt and Etherow; receives as affluents the Tame, Irwell, Hollin, and Weaver; expands into an estuary 18 miles from its mouth at Runcorn; entire length, 70 miles. The Manchester Ship Canal is entered at Eastham on the Mersey estuary.

Merthyr-Tydvil, or **Tydfil**, a parliamentary borough of South Wales, county of Glamorgan, on the Taff. The town owes its prosperity to its situation near the centre of the coal- and mineral-field of South Wales. Pop. (1921), 80,161.

Merton College, Oxford, first founded at Maldon, in Surrey, in 1204 by Walter de Merton, Bishop of Rochester and Lord High Chancellor of England, was removed to Oxford before 1274.

Meru, a mountain of Tanganyika Territory, Africa, west of Kilimanjaro. Altitude, 14,935 feet.

Merv (ancient *Antiochia Margiana*), a town of Asiatic Russia, in the Transcasian province, and in an extensive oasis producing wheat, barley, rice, cotton, and melons. Merv stands on the Murghat, and is on the Transcasian Railway, on the road to Herat. Carpets, silks, and silver-ware are manufactured. Merv is mentioned in the *Zendavesta*, was refounded by Alexander the Great, and was successively in Arab, Seljuk, Turk, and Mongol hands before occupation by the Russians in 1883. Pop. about 100,000.

Meshed, a town of Persia, capital of the province of Khorassan and a sacred city of Shiah Mahomedanism, containing the tomb of Imâm Ruza, son of Ali and grandson of Mahomet. Swords, velvets, silks, cottons, and jewellery are manufactured, but Meshed owes its prosperity to the annual influx of about 100,000 pilgrims. Pop. about 60,000. During the European War Meshed was occupied by the British

(1918) to guard the Transcaspiian Railway from fanatical Bolsheviki.

Mesmer, Friedrich Anton, German physician, founder of the doctrine of mesmerism or animal magnetism, was born in 1733, died in 1815. He professed to cure diseases by stroking with magnets, but about 1776 he renounced their use, and declared that his operations were conducted solely by means of the magnetism peculiar to animal bodies. He went to Paris in 1778, where he achieved considerable success and fame and made many converts to his views, but was regarded by the medical faculty as a charlatan. The Government at length appointed a committee of physicians and members of the Academy of Sciences to investigate his pretensions. The report was unfavourable, and the system fell into disrepute. Mesmer retired to Swabia, where he died.

Mesmerism. See *Hypnotism*.

Mesne (mēn), in law, middle or intervening; as, a *mesne* lord, that is, a lord who holds land of a superior but grants a part of it to another person. In this case he is a *tenant* to the superior, but *lord* or superior to the second grantee. *Mesne* profits are the rents and profits of land accrued while the land is in the possession of an occupier not lawfully entitled thereto. The action brought by the true owner to recover such profits is known as an action of *mesne* profits.

Mesophytes, plants adapted to grow under average conditions of water-supply, such as the vegetation of meadows, also most cultivated crops of temperate countries. See *Hygrophytes*; *Xerophy*.

Mesopotamia, literally 'the land between the rivers', a name given by the Greeks to the extensive region enclosed by the Tigris and Euphrates, anciently associated with the Assyrian and Babylonian monarchies. Its Old Testament name is *Aram Naharaim* (Gen. xxiv, 10), or *Padan Aram*. Mesopotamia was formerly a part of the Turkish Empire, and was composed as follows:

Vilayet.	Area. Sq. Miles.	Population.
Bagdad	54,540	900,000
Basra	53,590	600,000
Mosul	35,130	500,000
Mesopotamia ..	143,250	2,000,000

During the European War the country was conquered by British troops, and was erected into an independent state under Article 22 of the Covenant of the League of Nations, a mandate being authorized. By the Treaty of

Sèvres (10th Aug., 1920) Turkey confirmed this agreement, Britain acting as mandatory. On 23rd Aug., 1921, Emir Feisal, third son of the King of the Hejaz and ally of Britain in Mesopotamia, was proclaimed King of Irak and crowned at Bagdad. The prevailing religions of Mesopotamia are Shiah and Sunnite Mahomedanism, with some Jewish and Christian sects. Among industries agriculture, carried on by the help of irrigation, is important, wheat, barley, cotton, dates, and ground-nuts being produced. Some asphalt deposits are worked at Hit, on the Euphrates. Oil, however, is the chief product; petroleum wells are worked at Mandali, near Bagdad, and at Gazara, near Mosul. Imports are mainly of cotton goods and sugar; staple exports are grain and carpets. The Bagdad Railway (European 4-foot-8½-inch gauge) traverses the country, with a line between Bagdad and Samarra and other offshoots.—**BIBLIOGRAPHY:** K. Bevan, *The Land of the Two Rivers*; L. J. Hall, *The Inland Water Transport in Mesopotamia*.

Mesopotamia Commission, a Committee appointed in Aug., 1916, to inquire into the British campaign in Mesopotamia during the European War, and the disaster of General Townshend beyond Kut. The Commission consisted of Lord George Hamilton (chairman), Lord Hugh Cecil, Admiral Sir Cyprian Bridge, General Sir Neville Lytton, Sir Archibald Williamson, M.P., Mr. John Hodge, M.P., and Commander Josiah Wedgwood, M.P. The report of the Committee was published in June, 1917, strongly censured both the India Office and the Indian Government, and made them responsible for the ill-advised policy and the defects of execution which resulted in Townshend's disaster. All the commissioners signed the Report, with the exception of Commander Wedgwood, who made a separate report. Mr. Chamberlain resigned the Secretaryship of India, being succeeded by the Right Hon. Edwin Montagu (resigned 9th March, 1922).

Mesozoic (from Gr. *mesos*, middle, and *zōē*, life), the term applied by geologists to the era and group of stratigraphical systems between the Palaeozoic and the Cainozoic. The Mesozoic group is coextensive with the Secondary formations, and includes the rocks of the Triassic, Jurassic, and Cretaceous systems.

Mesquite (*Prosopis glandulosa*), a small tree allied to the acacia, common in Mexico, Texas, and other parts of western North America. It yields a gum not much inferior to gum arabic; its seeds are eaten, and a drink is prepared from the mucilage of its pods. Another species (*P. pubescens*) has pods that are eaten by the Indians, being rich in saccharine matter. They are of a twisted form, hence the name 'screw bean'.

Mess, a word derived from the Latin and French, and meaning 'those who take their food at the same table'. At the present day the word is used almost exclusively in naval and military circles. On His Majesty's ships the principal officers' mess is known as the 'ward-room', while that for the junior officers is the 'gun-room', in both cases the word 'mess' being understood. In the army every regiment, battalion, or similar unit has its officers' mess and sergeants' mess, both conducted by a committee of officers or non-commissioned officers for the benefit of the members, partly according to certain well-defined rules, and partly according to ancient custom and unwritten laws of the service. To a regimental officer the mess, under which name is included all the rooms set apart for general use, such as the dining- or mess-room, the sitting- or ante-room, and the billiard-room, fulfils the dual purposes of a home and a club for as long as he remains in the regiment. All officers of a unit are necessarily members of the mess, while the unmarried officers are what is known as 'dining members', i.e. they must live and eat and generally have their being in the mess. Married officers use it more as a club. All, married or single, pay a certain fixed monthly subscription towards the upkeep of the mess, while the 'dining members' pay in addition a daily sum for their food or 'messing'. The mess dinner is a parade for all 'dining members', and anyone wishing to be absent on a given occasion is expected to obtain permission as from a parade. In practice this is done by merely writing one's name in a book kept for the purpose. This custom of treating the mess dinner as a parade is said to have originated—as did messes themselves—in 1745, when the Young Pretender was active in Scotland. In those days there were many Jacobite sympathizers in the English Royal army, and, it being the custom for officers to feed as and when they liked, there was little to prevent such sympathizers from attending treasonable meetings under cover of darkness. The order consequently went forth that for the future all officers of a regiment would dine together and in uniform, the underlying idea being no doubt that, in those days of hard drinking, the conviviality inseparable from such a form of communal dinner would keep the treasonably inclined ones occupied till they were too sleepy to think of anything else but getting to bed. From these hot-blooded three-bottle days descend also some of the unwritten laws of a present-day mess, e.g. the rule against drawing a sword in a mess or that prohibiting the mention of a lady's name. The necessity for these rules can easily be seen when one remembers that duels took place with considerable

frequency, and often on the very flimsiest pretexts, as late as the 'forties of the last century.

In all officers' messes the king's health is drunk usually once a week, all officers standing. The usual procedure is that the president rises and proposes the toast in the words 'Mr. Vice—The King'. The vice-president replies 'Gentlemen—The King'. The band plays a part or the whole of the National Anthem, after which all officers repeat the words 'The King' and drink. The late King Edward, in conformity with the spirit of the times, issued an order that the sovereign's health might, according to the taste of the individual, be drunk in water. In the navy the loyal toast is drunk sitting, for obvious reasons.

Messenia, a department of modern Greece. Pop., about 219,000. In ancient Greece Messenia was a country located in the southern part of the Peloponnesus. Its capital was Messenē. Messenia struggled long in defence of her liberty against the Laedæmonians, with whom she waged three wars between 743—724 B.C., 685—668 B.C., and 464—456 B.C.

Messiah (Gr. form, *Messias*; Heb. *Mashiach*), corresponding to the Greek *Christos* of the New Testament, that is, 'anointed', has in the Old Testament several applications, as to the whole Jewish people, to the priests, to the kings ('the Lord's Anointed'), and even to Gentile kings, as persons who had been anointed with holy oil. The designation, however, owes its special importance to the application of it in the prophetic books of the Old Testament to an ideal holy king and deliverer whose advent they foretold. The whole of the prophetic pictures agreed in placing Jehovah in the central place of the desired kingship. These prophecies, which are called the Messianic prophecies, had at the time of our Lord come to be applied by the Jews to a temporal king who should free them from foreign oppression. They are affirmed by Jesus Christ and His apostles to apply to and be fulfilled in Him; and this is the belief of the Christian Church, by which He is called 'The Messiah'. The rationalistic school of theologians assert that Jesus laid claim to the dignity either to meet the preconceptions of His countrymen, or because He felt that the truth which He taught was the real kingdom never to be destroyed which the God of Heaven was to set up.—**BIBLIOGRAPHY:** M. Vernes, *Histoire des idées messianiques*; W. V. Stanton, *The Jewish and the Christian Messiah*; J. Drummond, *The Jewish Messiah*.

Messina, a maritime province of Sicily, traversed by mountain ranges (Monte Sori, 6055 ft.) falling east and north to the sea; railways are confined to the coast-line. Copper, sulphur, flax, corn, fruit, oils, and wine are produced.

Messina is the capital. Area, 1254 sq. miles; pop. estimated at 500,000.

Messina (ancient Gr. *Zancle*; Rom. *Messana*), a seaport city of Sicily, capital of the province of Messina, on the Strait of Messina. The harbour is celebrated. Messina was destroyed by earthquake on 28th Dec., 1908, when 70,000 people perished. Oranges, liquorice, pumice-stone, wine, and oils are exported. Pop. estimated at 150,000 (commune).

Messina, Strait of, the channel separating Italy from Sicily, and connecting the Tyrrhenian with the Ionian Sea; length, 20 miles; breadth, from 2 to 14-15 miles. It is deep and the current is strong; and it is almost certain that the Scylla and Charybdis of the *Odyssey* were situated here. Anciently the strait was called *Mamertinum Fretum* or *Fretum Siculum*.

Messuage, in English law, is the term used for a dwelling-house with a piece of land adjoining assigned to the use thereof. In Scottish law it denotes the principal dwelling-house of a barony, being synonymous with the English *manor-house*.

Meta, an intendency and river of Colombia, South America. The intendency has an estimated area of 126,000 sq. miles. Pop. (1918), about 34,000, 22,400 being Indians. Villavicencio is the capital. The river rises in the Cordillera Oriental, and flows through Colombia to join the Orinoco, of which it is the chief tributary; length, about 650 miles.

Metabolism (Gr. *metabolé*, change), in biology, the cycle of chemical changes which continually goes on in living organisms, and consists of constructive processes (anabolism or assimilation), resulting in the gradual building up of living matter (protoplasm), and destructive processes (katabolism), whereby complex substances are resolved into simpler ones, with the ultimate formation of waste products (water, carbon dioxide, and nitrogenous compounds), and the conversion of potential into kinetic energy. In green plants the first step in anabolism is the synthesis of water and carbon dioxide (photosynthesis) into formic aldehyde. This is rendered possible by the presence of a green pigment (chlorophyll) which possesses the power to use the kinetic energy of sunlight for this purpose. Animals, however, require complex food-stuffs, derived from other organisms, and the soluble substances formed by the digestion of these constitute the building materials for constructive purposes. Colourless plants (fungi, yeasts) also require complex organic food, but the necessary nitrogen can be derived from tartrates, which are much simpler than the proteins required by animals.

Metacentre. See *Stability of Ships*.

Metallography, a branch of metallurgy

dealing with the internal structure of metals and alloys, and its relation to their composition and to their physical and mechanical properties. It is closely related to physical chemistry, since the internal structure depends on the physical and chemical conditions under which the solid metal or alloy is formed. Metallography also takes into account the mechanical arrangement of the component particles of metals and alloys, and is thus intimately connected with crystallography.

The word *metallography* was formerly used to signify the description of metals and their properties, but in this sense it is now obsolete. It was reintroduced by Osmond in 1892 to designate the microscopic structure of metals and alloys, but its meaning has gradually been extended to cover the results of other methods of examination, and now includes the complete physical study of metals and alloys.

The most important methods of examination used in the study of metallography are pyrometric, in which complete records are made of the rate of solidification and cooling of alloys; and microscopic, in which prepared sections of the alloys are highly polished, treated with suitable etching reagents, and examined by the microscope. By these means exact knowledge of the constitution of alloys is obtained, and in the case of iron and steel certain constituents have been named, the best known being ferrite, cementite, austenite, martensite, troostite, sorbite, and pearlite.—BIBLIOGRAPHY: C. H. Deach, *Metallography*; J. W. Mellor, *The Crystallisation of Iron and Steel*; W. Rosenhain, *An Introduction to the Study of Physical Metallurgy*.

Metallurgy is the art of extracting metals from their ores and adapting them for use in the metal industries. The art comprises the whole of the processes involved in the separation of the minerals containing the metals from other matters associated in the ore, smelting or treatment of the minerals for the separation of the metals, refining the metals thus produced, and casting them into suitable forms; and generally includes preliminary mechanical work for the production of shapes and sizes suited to particular branches of the metal industries. The success of the art of metallurgy depends on a large number of facts concerning the metals; the determination of these facts and their application to the requirements of the metallurgist may be said to constitute the science of metallurgy. A complete study of the various branches of metallurgy requires a knowledge of many other branches of science. Geology and mineralogy must be studied in connection with the occurrence and distribution of the ores and minerals in nature. Not only is an accurate knowledge of the properties and values of the metallic minerals required, but also a knowledge

of the effect of impurities on these properties, and also the effect of associated minerals, rocks, &c. A knowledge of chemistry is of vital importance to the metallurgist, and, in fact, metallurgy is frequently considered as a specialized branch of chemistry. The analysis and valuation of ores and minerals requires a knowledge of analytical chemistry, and practically all the methods used in the extraction of the metals are based on chemical reactions.

A good knowledge of physics is becoming of more and more importance to the modern metallurgist, not only as regards the application of heat and electricity to the extraction of metals, but also with reference to the properties of the metals as applied in the arts, and especially in connection with the study of the constitution and properties of alloys, a branch of the work now known as metallography (q.v.). A knowledge of mechanics is also essential to the metallurgist in connection with the study of mechanical properties of metals and alloys, such as strength, hardness, &c., and also in the design of the plant necessary for successfully carrying out on a commercial and profitable scale the various operations necessary in the practice of metallurgy.

The workers in the various chemical, electrical, and engineering institutions undertaking research work soon find that for the solution of their problems they must have materials with such combinations of properties as have not been found before, or that a common substance could be used for a certain purpose if an obnoxious property could be removed. Corrosion troubles in chemical plant and steam-condenser tubes; the growth, and ultimate breakdown of the structure, of cast iron when used in plant using superheated steam; the peculiar wear that takes place in the cylinders and piston rings of certain internal-combustion engines, all present problems of a metallurgical character. In fact in almost every field of industrial activity an essential requirement is a thorough knowledge of metallurgy.

For the extraction of the metals widely different processes are used, depending on the nature of the occurrence of the metal and on its chemical and physical properties. After the mineral matter has been obtained from its deposit in the earth's crust by the miner, it is frequently submitted to crushing, sizing, washing, and concentrating operations in order to fit it better for subsequent treatment; these operations are sometimes considered as falling within the domain of the mining engineer, but are frequently regarded as part of the duty of the metallurgist. The metals sometimes occur in the free or native condition, as in gold, silver, copper, &c.; they are found more frequently as oxides (iron, copper, tin, &c.), and as sulphides (copper, lead,

zinc, &c.); and occasionally as other chemical compounds, such as silicates, carbonates, sulphates, arsenides, &c. Very often, especially where the ores occur in large masses of uniform composition, as in the case of iron ores, the only preliminary treatment is one of crushing and sizing. In other cases there is a considerable difference between the specific gravities of the valuable mineral and the worthless minerals associated with it in the deposit, and by crushing to a suitable size and washing with water the waste minerals may be washed away, and the heavier valuable mineral may thus be concentrated into smaller bulk for treatment. This process of water concentration is largely used in the treatment of tin ores, lead ores, &c.

The magnetic properties of some minerals render them capable of easy separation from non-magnetic minerals, so that magnetic concentration of minerals is of some importance. The use of oil in assisting certain mineral particles to float on water has become of great importance during recent years, and at the present time vast quantities of mineral are treated by some form of oil flotation concentration process (see *Flotation of Minerals*). The methods applied for the actual extraction of the metal may be divided into dry or smelting methods, and wet or solution methods; but before either type of method is used, the ore is frequently submitted to an operation of calcination or roasting which may result in an alteration of physical properties; for example, a dense close ore may be made comparatively porous, or certain chemical changes may take place, with the result that sulphides are converted into sulphates and oxides, carbonates into oxides, &c. The operation of smelting has for its objects the extraction of the body sought for, either as metal or as a concentrated compound of a metal, such as sulphide (known as *malle*) or arsenide (known as *speiss*), from which the metal may be recovered as such; and the separation of the associated non-metallic mineral matter as a slag.

The formation of this slag is generally assisted by the inclusion of a flux in the smelting mixture. Iron is obtained in the form of pig-iron direct by the smelting of oxide ores in blast-furnaces; tin is obtained by smelting tin ores in reverberatory furnaces. When smelting methods are to be undertaken, there are two important matters which have to be taken into account, viz. the fuel used as a source of heat, and the refractory materials to be used in the construction of the furnaces. For metallurgical purposes the fuel may be either solid (e.g. coal, coke, charcoal), liquid (e.g. various varieties of mineral and distillate oils), or gaseous (e.g. coal-gas and producer-gas). The kind of fuel which is best suited for any particular smelting operation will

depend on the temperature required for the operation and the type of furnace best suited for the reactions. The selection of suitable refractory materials for the erection and lining of metallurgical furnaces is obviously of great importance, as the vessels or structures used must be able to resist a higher temperature than that required for the reactions. Within recent years various metallurgical smelting processes have been introduced in which electric current is used as the source of heat instead of fuel; these are generally known as electro-thermic processes. In wet processes the ore is submitted to the action of some solvent which is capable of dissolving out the valuable constituents, leaving the barren mineral mass behind. Generally speaking, wet methods are not so efficient as smelting methods, but there are several exceptions to this rule, the most important occurring in the case of gold, in the extraction of which the finely crushed ore is lixiviated with a solution of sodium or potassium cyanide, which dissolves the gold readily. In wet processes means must be provided not only for the solution of the metal, but also for the recovery or precipitation of the metal from solution. This is generally carried out either by a chemical process or by electrical deposition. As examples of the former method may be mentioned the precipitation of gold from cyanide solutions by means of metallic zinc, and the precipitation of metallic copper on iron from solutions of sulphate or chloride of copper. As examples of electro-deposition methods may be mentioned the recovery of copper from sulphate solutions, and the recovery of zinc from zinc sulphate solutions, the latter process having become of very considerable importance during recent years. Metals as extracted by smelting or wet methods, with the exception of those which are electro-deposited, are generally impure, and require an operation of refining before they are fit for industrial uses. The commonest processes are fire-refining, used in the case of copper, tin, lead, &c.; and electro-refining, used in the case of copper, lead, gold, &c. In fire-refining the metal is generally melted down, and the impurities present are oxidized by atmospheric oxygen. Electro-refining is very similar in operation to electro-plating or depositing, a suitable bath being used in which anodes of the crude metal are placed together with cathodes consisting of thin plates of the pure metal. By the use of suitable current the metal is dissolved at the anode and deposited at the cathode, the impurities being either left as an insoluble residue at the anode or passed into solution where they accumulate. The manufacture of the various classes of iron and steel from pig-iron may be considered as refining operations, although some-

thing more than mere refining is required in these cases. Comparatively few of the metals are used in the industries in the pure state, and a very important matter to the metallurgist is the influence of the presence of very small quantities of other elements on the properties of the metals. In some cases these small quantities have a very deleterious action; the admixture of a little bismuth with copper, for example, renders the copper brittle and quite unfit for many industrial purposes; on the other hand, all the valuable properties of ordinary steel depend on the presence of quite small quantities of carbon. In the industries comparatively few metals are used in the pure state, as more useful properties are obtained by an association of metals with each other in the form of alloys; for example, pure gold is too soft for use as jewellery or for coinage, but by the addition of copper, silver, &c., the hardness is increased and the wearing properties improved. Copper, again, when associated with zinc in the form of brass, or with tin in the form of bronze, is of greater service for most purposes than pure copper. To indicate the enormous scale on which the metallurgist works, the following figures are given to show the world production of some of the non-ferrous metals in 1918: aluminium, 169,713 tons; copper, 1,387,615 tons; gold, 18,474,406 ounces; lead, 1,183,598 tons; silver, 202,834,688 ounces; tin, 132,216 tons; zinc, 853,301 tons.—BIBLIOGRAPHY: A. H. Sexton and C. O. Bannister, *An Elementary Textbook of Metallurgy*; Sir W. Roberts-Austen, *An Introduction to the Study of Metallurgy*; W. Gowland, *The Metallurgy of the Non-Ferrous Metals*; L. S. Austin, *The Metallurgy of the Common Metals*.

Metals. Elementary substances have been divided by chemists into two classes, *metals* and *non-metals*, but these merge into each other by gradations so imperceptible that it is impossible to frame a definition which will not either include some non-metallic bodies or exclude some metallic. Intermediate elements, such as arsenic and antimony, are sometimes called *metalloids*. The term metal is an ideal type, and is applied to those elements which approximate closely to the type as regards their general physical and chemical properties. The following are some of the chief characteristics of metals. They are opaque, having a peculiar lustre connected with their opacity called *metallic*; fusible by heat; good conductors of heat and electricity; capable, when in the state of an oxide, of reacting with acids and forming salts, i.e. their common oxides are basic oxides; and have the property, when their compounds are submitted to electrolysis, of generally appearing at the negative pole of the battery. Many of the metals are also malleable, or susceptible of being beaten or rolled out into sheets or leaves, and some of them are

extremely ductile or capable of being drawn out into wires of great fineness. They are sometimes found native or pure, but more generally combined with oxygen, sulphur, and some other elements, constituting *ores*. The great difference in the malleability of the metals gave rise to the old distinction of *metals* and *semi-metals*, which is now disregarded. The following—sixty-eight in number—are the principal substances usually regarded as metals: actinium, aluminium, antimony, arsenic, barium, beryllium or glucinum, bismuth, cadmium, caesium, calcium, cerium, chromium, cobalt, columbium or niobium, copper, dysprosium, erbium, europium, gadolinium, gallium, germanium, gold, holmium, indium, iridium, iron, keltium, lanthanum, lead, lithium, lutecium, magnesium, manganese, mercury, molybdenum, neodymium, nickel, osmium, palladium, platinum, polonium, potassium, praseodymium, radium, rhodium, rubidium, ruthenium, samarium, scandium, selenium, silver, sodium, strontium, tantalum, tellurium, terbium, thallium, thorium, thulium, tin, titanium, tungsten, uranium, vanadium, ytterbium, yttrium, zinc, zirconium. Of these gold, silver, copper, tin, lead, zinc, platinum, and iron are the most malleable; gold, which possesses the quality in the greatest degree, can be hammered into leaves $\frac{1}{1000}$ of a millimetre in thickness. The following, given in the order of their ductility, are the most ductile: gold, silver, platinum, iron, nickel, copper, aluminium, zinc, tin, lead; platinum wire has been obtained of not more than $\frac{1}{1000}$ of a millimetre in diameter. The majority of the useful metals are between seven and eight times as heavy as an equal bulk of water; platinum, osmium, and iridium are more than twenty times as heavy; while lithium, potassium, and sodium are lighter. The metals become liquid, or change their physical state, at widely varying temperatures: platinum is only fusible at the high temperature of 1755°C. , iron melts at 1530°C. , and silver at 960°C. , while potassium melts below the boiling-point of water, and becomes vapour at a red heat, and it and sodium may be moulded like wax at 16°C. Mercury is liquid at ordinary temperatures, and freezes only at 38.8°C. below zero. Osmium and tellurium are regarded by some as non-metals. All the metals, without exception, combine with oxygen, sulphur, and chlorine, forming *oxides*, *sulphides*, and *chlorides*, and many of them also combine with bromine, iodine, and fluorine. Several of the later discovered metals exist in exceedingly minute quantities, and were detected only by spectrum analysis, and there is every likelihood that research in this direction will add to the present list of metals.

Metamerism, in chemistry, a particular form

of isomerism used to characterize certain substances having the same molecular weight and containing the same elements in the same proportion, but which have totally different properties. The term is not much used now, the wider term *position isomerism* taking its place. Thus ethyl alcohol ($\text{CH}_3\text{CH}_2\text{OH}$) and methyl ether (CH_3OCH_3) are spoken of as being metameric, and methyl formate (HCOOCH_3) and acetic acid (CH_3COOH) are also metameric.

Metamorphic Rocks, in geology, stratified or unstratified rocks of any age whose original texture has been altered and rendered less or more crystalline by subterranean heat, pressure, or both, accompanied usually by chemical changes. Metamorphic rocks are naturally best represented among the lowest and azoic, or non-fossiliferous, masses, consisting of crystalline schists, and embracing granitoid schist, gneiss, quartzite, mica-schist, and clay-slate. Many of these rocks were originally deposited from water and became crystallized by subsequent agencies. They exhibit for the most part cleavage, crumpling, and foliation; and lines of original stratification are often indistinct or obliterated. The metamorphic gneisses are commonly altered granites, that is, of igneous origin in the first instance. Hornblende and chlorite schists are usually altered igneous rocks of basic character.

Metamorphosis, any marked change of form, shape, or structure. In ancient mythology the term is applied to the transformations of human beings into inanimate objects, with which ancient fable abounds. In zoology it includes the alterations which an animal undergoes after its exclusion from the egg or ovum, and which greatly modify the general form and life of the individual. In a butterfly, for example, the egg hatches out into a worm-like actively feeding caterpillar (larva), which passes into a motionless chrysalis (pupa), from which the adult (imago) emerges. Insects which undergo a complete metamorphosis of this kind are known as *Heteromorphous* or *Holometabolic* insects. These are also termed the *Endopterygota*, from the fact that the wings develop from internal rudiments. Other insects, such as the grasshoppers, locusts, bugs, dragon-flies, &c., undergo a less perfect series of changes, and are termed *Hemimetabolic* or *Homomorphous* insects. The name *Esopterygota*, also applied to them, refers to the fact that the wing rudiments project externally. The occurrence of metamorphosis is by no means confined to the lowest groups of the animal series, for we find the amphibian Vertebrates—as in the case of frogs, newts, and their allies—exemplifying these phenomena in a very striking manner; as also do fishes, lampreys, lancelets, and tunicates. Metamorphoses of some Invertebrates,

however, including the insects, crustaceans, worms, &c., are among the most marked and familiar with which we are acquainted.

Metaphor, a figure of speech founded on the resemblance which one object is supposed to bear, in some respect, to another, and by which a word is transferred from an object to which it properly belongs to another in such a manner that a comparison is implied, though not formally expressed. It may be called a simile without any word expressing comparison. Thus, 'that man is a fox', is a metaphor; but 'that man is like a fox', is a simile. So we say, a man *bridles* his anger; beauty *awakens* love or tender passions; opposition *fires* courage.

Metaphysics, a branch of philosophy which deals with ultimate reality, with the problem of unity, or the fundamental principle animating the universe. Each science, in its own domain, employs certain conceptions as its tools and instruments. It investigates the forms and changes of things and the manifestations of matter; it deals with the laws and facts of the material world as it is revealed to our senses. Science, however, does not question the value of the conceptions, such as space, time, cause, effect, matter, and form, of which it avails itself. The cause of a fact is another fact, the cause of a movement another movement. The sphere of science is limited by the boundary-line of the finite, by facts based on experience. It does not inquire *why* matter is, nor does it deal with the ultimate grounds of *being* and the attributes which belong to it as such. The human spirit, however, in its inquisitiveness, is not satisfied with this knowledge. There must be something permanent and eternal, some hidden energy, something everlasting and absolute, which is the cause of all reality. There should therefore be a science which takes as the object of its investigations the very conceptions of which other sciences avail themselves, but which they have become accustomed to consider as needing no explanation. This science is metaphysics. Not content with a knowledge of things as they appear to our senses, possibly so as to seem different from what they really are, metaphysics deals with the very essence of things, searches for ultimate reasons, and endeavours to know what is *behind* or *beyond* the natural phenomena. It investigates the ultimate principles that underlie and are presupposed in all *being* and *knowledge*.

The term metaphysics is due to a simple literary accident. The friends and followers of Aristotle, having placed his writings dealing with the question of the essence of things and bearing the title of *First Philosophy* under the part which he described as physics, placed the writings metaphysics, i.e. after physics, in the

title's own formal definition of First Philosophy was that of "a descriptive definition of Being as Being". Since then metaphysics has been variously defined, and much difference of opinion has prevailed as to its character and function, and even its utility. It has been said that the metaphysician is a poet who has lost his vocation, or that 'metaphysics constituted the romance of mind'. Kant defined metaphysics as the science of a priori laws of thought in their relation to objects; Wolff styled it ontology; Ed. von Hartmann called it the philosophy of the unconscious, whilst Bergson defines it as being "a science which claims to dispense with symbols". Throughout the eighteenth and nineteenth centuries the term metaphysics was applied to inquiries concerning mind and matter, and divided into *ontology*, dealing with being, and *epistemology*, dealing with the nature and limits of human knowledge.

To sum up, metaphysics is the science of the first cause, of a cause which has no other causes behind it, or the science of ultimate principles independent of other principles. It deals with appearance and reality, with unity and diversity, with activity and passivity, mingled in the universe and revealed to our observations. It deals with the relations of cause and effect, investigates the true nature of such conceptions as space and time, and discusses the question whether reality is given in experience.

The Problems of Metaphysics.—The problems with which metaphysics deals existed long before the term, based on a literary incident, was applied to them. They were treated before Aristotle by the Ionian philosophers and by Plato. Among the numerous questions which man, seized with feeling of wonder and anxious to solve the riddle of the universe, had been asking himself were the following: What is? What exists? What do I know? The man of an ordinary, unreflective mind readily replied: 'All that surrounds me, all that I grasp and touch'. The philosopher, however, endeavoured to find the fundamental principle which lies behind existence, and from which all things proceed. He asked himself: 'What is the common essence of all substances amidst the various forms of manifestation?' He had noticed the existence of a plurality of things and of the apparently contradictory principles of activity, or movement, and passivity, the principles of mind and matter, and he investigated the cause of these contradictions, apparent or real, and the nature of their interrelations. Various answers have been given to these questions by different philosophers. Some admitted only one principle, or cause, as the essence of all things—this theory is called *monism* (Gr. *monos*, alone)—whilst others maintained that there were two principles (*dualism*),

or a plurality of principles (*pluralism*). The *monists* again differed in opinion. 'There is nothing but spirit' said some of these philosophers, whilst 'there is nothing but matter' taught others. The theory of the latter is termed *materialism* (q.v.), that of the former *spiritualism* (or *idealism*). In contradistinction to *monism*, *dualism* is the theory which admits the existence of two substances, material and immaterial, mind and matter. Some thinkers, however, as has been pointed out, include in metaphysics not only the question of the real or apparent relation between mind and matter, but also the question of knowledge itself and the relation between a known subject and the knowing mind. Metaphysics is thus supposed to deal not only with the essence and origin of being, but also with knowledge, its essence and limitation. Faced by the philosophical problem as to whether it is at all possible for the human mind to solve the questions concerning the nature and origin of being, philosophers investigated the very nature of knowledge and its possibility. They asked themselves: 'Is the human mind capable of obtaining certitude?' Again various answers have been given to this question. *Dogmatism* affirms the harmony of thought and its object, thought being the natural connection between mind and matter. *Scepticism*, on the contrary, denies the possibility of knowledge. The human mind, it maintains, may strive to know the nature of the thing or object, but can never really reach it. Some philosophers think that knowledge is the exact copy and representation in our mind of reality. Things are exactly so in reality as they appear to us through the medium of our perceptive faculties. Appearance and reality are absolutely identical, and knowledge is the perception of things as they really are. In sense-perception we thus have a guarantee of the reality of existence. This theory is called *realism*. In contradistinction to this doctrine, *idealism* derives the object of knowledge from the knowing mind itself. It maintains that perceptions of 'things in themselves' and 'existence', or 'reality', are widely different. Knowledge is an inner, psychical process, and there could be no similarity between it and the things 'without'. Knowledge is therefore not at all the perception of things as they *really* are, but as they *appear* to us. The world around us is only the product of our mind. In other words, 'the only reality of the external world is its perceptibility', and all that we know of the world around is only imagination, the product of our own mind. (See *Idealism*.) Such are briefly the problems of metaphysics, which thinkers and philosophers of all ages, 'a thousand poor and perspiring heads of us mortals' have tried to solve, although the modern materialist

is inclined to relegate the labours of the metaphysician to the lumber-room of useless objects. —BIBLIOGRAPHY: J. M. Baldwin, *Dictionary of Philosophy and Psychology*; P. Janet and G. Séailles, *A History of the Problems of Philosophy*; G. S. Fullerton, *A System of Metaphysics*; P. Deussen, *Elements of Metaphysics*; E. Vacherot, *La Métaphysique et la Science*; A. S. Rappoport, *A Primer of Philosophy*.

Metastasio, Pietro Buonaventura, Italian poet, born at Assisi 1698, died at Vienna 1782. His true name was Trapassi. He produced many operas, commencing with the *Didone Abbandonata* in 1724. His success was such that Charles VI invited him to Vienna in 1729, and appointed him Poet Laureate with a pension of 4000 guilders. Metastasio may be said to be the father of the modern Italian opera. His works, while not possessing the highest literary merit, were eminently fitted for musical effect.—Cf. Vernon Lee, *Studies of the Eighteenth Century in Italy*.

Metay'er, a cultivator who tills the soil for a landowner on condition of receiving a share, generally a half of its produce, the owner furnishing the whole or part of the stock, tools, &c. The phrase *metayage system* is applied to that mode of land cultivation, practised chiefly in France and Italy, in which the land is cultivated by metayers.

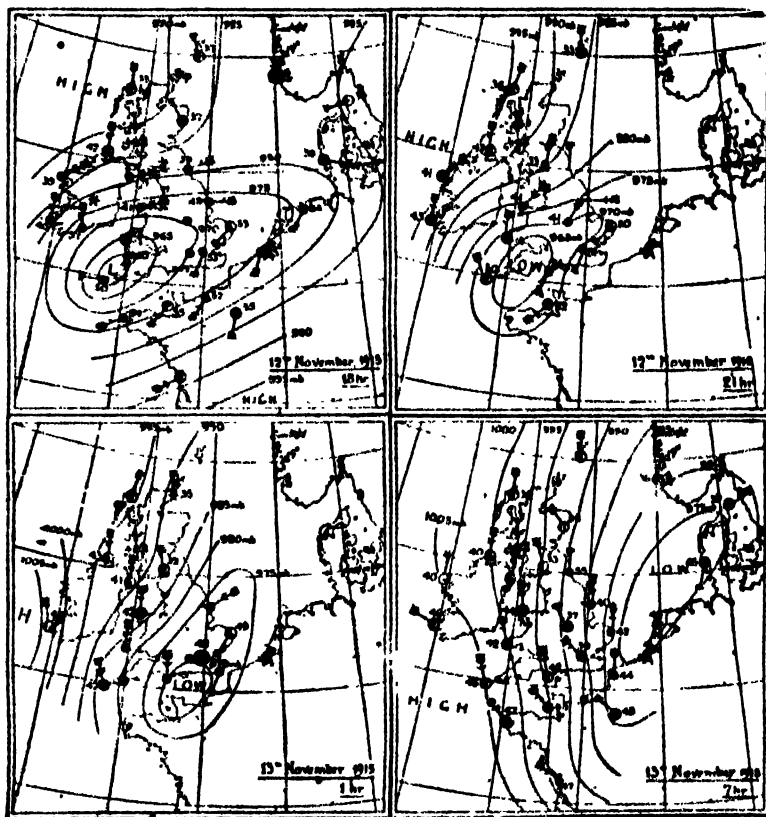
Me'teor, a name originally given to any atmospheric phenomenon; it is now more usually applied to the phenomena known as shooting-stars, falling-stars, fireballs or bolides, aerolites, meteorolites, meteoric stones, &c. It is now generally believed that these phenomena are all of the same nature, and are due to the existence of a great number of bodies, most of them extremely minute, revolving round the sun, which, when they happen to enter the earth's atmosphere, are heated by friction and become luminous. Under certain circumstances portions of these bodies reach the earth's surface, and these are known as meteorites or meteoric stones. They are composed of chemical elements found terrestrially, and are mostly of a stony nature, but a few are almost pure iron, alloyed with nickel. Many showers of meteors are associated with particular dates in the year, when they appear to diverge from a point in the sky known as the radiant. Well-known showers are the *Perseids* of August, and the *Leonids* and *Andromedids* of November. As to the connection of meteors with comets, see *Comets*.

Meteoric Stones. See *Meteor*.

Meteorology, literally the study of meteors. The term 'meteors' signifies things elevated above the earth, and was originally applied to luminous appearances of any kind in or supposed to be in the sky. Astronomy and meteorology are now

pretty sharply differentiated, and meteorology is concerned not only with appearances of a luminous order, but undertakes investigation of the entire phenomena and conditions of the atmosphere, of climate, and of weather. On the other hand, it has practically nothing to do with meteors in the modern sense of the term, the consideration of these bodies, which arrive from

the pressure is reduced by a half. Above 50 miles or so the atmosphere can hardly have any appreciable density, but observations made on meteoric trails and auroral streamers show that it extends in extremely rarefied condition to 200 miles or more. The atmosphere is in constant motion, the movements being largely due to alterations of its temperature by solar heat,



Passage of a Depression across the British Isles

interplanetary space, coming within the province of astronomy.

The atmosphere is an ocean of gases, which surrounds the globe, pressing upon the solid land and liquid oceans which form its exterior. At the sea-level the normal atmospheric pressure is nearly 15 lb. per square inch, or equal to that given by a column of mercury some 30 inches high. If the density were the same throughout, this pressure would be produced by a height of atmosphere of about 5 miles, which would be the height of the homogeneous atmosphere. But air being a compressible fluid, its density diminishes upwards. At about 3½ miles the height

direct or reflected, by its own radiation into space, by convection between it and the land or sea surface, by evaporation and precipitation. The pressure changes from time to time, and from place to place, and a study of these changes, their causes and results, forms an important part of meteorology.

In the lowest parts of the atmosphere temperature generally diminishes with altitude. If a given mass of air were to rise, without any gain of heat from, or loss to, the surrounding air, it would expand through reduction of pressure, and thereby fall in temperature. The rate at which it would fall in temperature is called the

adiabatic lapse rate. If at any time the lapse rate is much less than the adiabatic, the state is very stable, and the atmosphere is likely to be calm. This frequently occurs in foggy weather in winter. If the air is actually colder at the surface than above, there is an exceedingly stable condition. The lapse rate is then negative, or there is said to be a temporary inversion. If the lapse rate is greater than the adiabatic, the overheated lower strata tend to rise, and there is great instability. This is often illustrated in the thunderstorms of summer. A temperature inversion never continues throughout a very great depth of atmosphere. But in recent years it has been found that the fall of temperature with increase of height, which always predominates in the lower atmosphere, proceeds only to a certain height, viz. 8 to 12 kilometres (5 to 7½ miles), there is reached a region where there is no further falling off, but a practically uniform temperature. This is called the stratosphere, or isothermal layer, and is remarkably quiescent. Its upper limit is unknown. The region below is called the troposphere. To the troposphere are confined the movements and changes which constitute weather, though possibly the first causes of these often operate from without.

Investigations of the upper air and of the currents prevailing at high altitudes have, of course, acquired a greatly increased importance through the modern development of aerial navigation. Aviation has also enabled the study of clouds to be much extended. Electrical and magnetic investigations are now regularly made at many stations. The older forms of meteorological work, which still retain their importance, include observation of atmospheric pressure by the barometer, temperature by the thermometer, humidity by the hygrometer, intensity of insolation and terrestrial radiation by the aid of the black-bulb and the grass thermometer, rainfall by the rain-gauge, bright sunshine by the sunshine recorder, wind direction and force by the wind vane and anemometer.

The weather phenomena of countries situated like our own are much more complex in general than those of lower latitudes. Their elucidation depends largely on the study of the moving pressure systems known as cyclones and anti-cyclones. The directions of the wind in these are given by Buys Ballot's Law, but it must be understood that the paths of the air particles are not, as sometimes supposed, mere spirals to or from the centre. The system consists of different air particles at different stages of its journey, and the path of any particle can be found only from a continuous series of charts, representing the wind directions at short intervals of time. Much has lately been done by such

study of air trajectories. Notwithstanding the complexity of atmospheric phenomena, meteorology is rapidly advancing from the stage of merely empirical knowledge to that of an exact science.

Methane, or Marsh-gas, CH_4 , is the fire-damp (q.v.) of miners. It is found in the gas-wells at Pittsburg, and exhales from the earth at Baku. The illuminating gas obtained by the destructive distillation of coal may contain 40 per cent of CH_4 (see *Gas Manufacture*). Methane may be obtained synthetically in many ways, e.g. by heating anhydrous sodium acetate with baryta. The density of methane is 8 ($\text{H} = 1$). It is condensed at 0°C . and 140 atmospheres, boils at -164°C ., and solidifies at -186°C . See *Hydrocarbons; Paraffins; Damps*.

Methil, a seaport town of Fifeshire, Scotland, on the North British Railway, 1 mile south of Leven. It has three docks and a tidal harbour on the Firth of Forth; coal is exported. Pop. 4382.

Methodists, a society of Christians founded by John Wesley, so called from the fact that the name was applied to Wesley and his companions by their fellow-students at Oxford. The religious movement which resulted in the foundation of this society began at Oxford in 1729, the chief leaders besides John Wesley being his brother, Charles, and George Whitefield. The first general conference of the Methodists was held in 1744, and the Methodists were constituted a legally corporate body in 1784. Their doctrines are substantially those of the Church of England. The appointment of a minister of the body to any circuit is annual, but the limit of a minister's term of service in one circuit varies in the different Methodist bodies. In the Wesleyan Church the usual period is three years. The body is governed by an annual conference, having at its head a president and secretary, whose term of office lasts but for a year. The District Meeting, or Synod, is an important feature of Methodist polity. The several chairmen are appointed either by Conference, as with the Wesleyans, or by the vote of the Synod, as with other Methodist bodies. There are also quarterly circuit meetings of ministers and lay officers. The supreme legislative and judicial power is vested in the Conference, to which the half-yearly and quarterly district and circuit meetings are subordinated. The number of members at Wesley's death was 76,968; in 1922 there were in different parts of the world about 30,000,000 adherents. Various secessions have from time to time taken place from the original body. The chief ones are: the Calvinistic Methodists, which originated in a difference between Wesley and the Calvinists regarding the Calvinistic doctrine of predestination; the Methodist New Connexion, founded

in 1797-8; Primitive Methodists (1806); Bible Christians; the Wesleyan Reform Union, and the United Methodist Free Churches, originating in the Wesleyan Methodist Association of 1836, with the subsequent additions of the Protestant Methodists of 1828, and the Reformers, who seceded from the parent connection in 1849-52. The New Connexion, the United Methodist Free Church, and the Bible Christians united in 1907 to form the United Methodist Church. Complete Methodist unity has been attained in some of the colonies, and there is a strong movement toward the same end in Great Britain. The Methodists are especially numerous in North America, forming numerically the leading denomination in the United States. The Methodist Episcopal Church is the oldest and leading Methodist body in America. In 1845 the Methodists of the Southern States formed the Methodist Episcopal Church, South.—BIBLIOGRAPHY: A. Stevens, *History of Methodism*; J. R. Gregory, *History of Methodism*; Green, *Mission of Methodism*; Townsend, Workman, and Eayrs, *The New History of Methodism* (2 vols.).

Meth'yl (CH_3), the name given to the organic radicle CH_3 present in many compounds and behaving like a single element, as in methyl sulphate, $(\text{CH}_3)_2\text{SO}_4$; methyl alcohol, CH_3OH ; and methyl chloride, CH_3Cl .

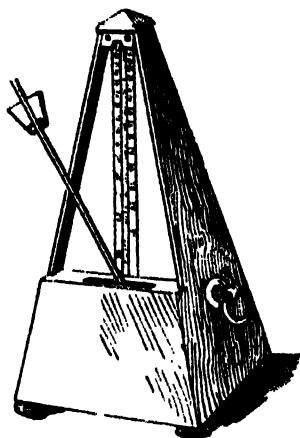
Methylated Spirit is rectified spirit of wine (ethyl alcohol, $\text{CH}_3\text{CH}_2\text{OH}$) 'denatured' by the addition of 10 per cent of wood naphtha, which contains a large proportion of methyl alcohol, $(\text{CH}_3)_2\text{OH}$. The naphtha gives a disagreeable taste to the spirit and renders it undrinkable; for this reason it may be sold, under restrictions, duty free. It is largely used in the manufacture of varnishes, as a source of heat when burnt in spirit-lamps, and as a solvent for many purposes in the chemical industry.

Metonic Cycle, or Metonic Year, the cycle of the moon, or period of nineteen years, in which the lunations of the moon return to the same days of the month; discovered in 432 B.C. by Meton, an Athenian mathematician. This cycle contains 235 lunations. It is still employed for determining the date of the Easter Full Moon, which regulates the ecclesiastical calendar.

Metric System, a decimal system of weights and measures based on the metre as the unit of length. The system originated in France at the time of the Revolution. Its use is now compulsory in most countries, and optional in some others, such as the United States, Japan, and (since 1897) Britain. See *Weights and Measures*.

Met'ronome, an instrument consisting of a weighted pendulum moving on a pivot and set in motion by clock-work; invented by Joseph Mastrani, for the purpose of determining, by its vibrations, the quickness or slowness with which musical

compositions are to be executed, so as to mark the time exactly. There is a sliding weight attached to the pendulum rod, by the shifting of which up or down the vibrations may be made slower or quicker. A scale indicates the number



Metronome

of audible beats given per minute, and this must be made to agree with the number attached to the music by its composer.

Metroside'ros, a genus of trees and shrubs, nat. ord. Myrtaceæ. *M. vera*, known as iron-wood, is a tree, a native of Java and Amboyna. Of the wood of this tree the Chinese and Japanese make rudders, anchors, &c. *M. robusta* is the rata of New Zealand, where it is employed in shipbuilding and in other ways. The trees of this genus have thick, opposite, entire leaves, and heads of showy red or white flowers.

Metshnikov, Ilya, Russian biologist, born in the province of Kharkov 1845, died at Paris 1916. Metshnikov gained a reputation by his investigation of the white blood corpuscles, but the subject to which he devoted most attention was that of the prolongation of life. He maintained the therapeutic value of lactic ferments, both as a preventive and a remedy in intestinal putrefaction. In 1909 he put forth the theory that soured milk contained bacilli which retard or counteract the intestinal putrefaction, responsible for senility. According to his belief, persons who had no organic disease could live to the age of 150. In 1908 he shared the Nobel Prize for medicine with Paul Ehrlich. His works include: *Leçons sur la pathologie comparée de l'inflammation* (1894), *L'Immunité dans les maladies infectieuses* (1901), *Étude sur la matière humaine* (1903), and *La Vieillesse* (1904).

Metternich (met'tér-nîk), Clemens Lothar Wenzel, Prince von Metternich, Austrian statesman, born at Coblenz 1773, died at Vienna 1859.

Entering the Austrian diplomatic service in 1794, he represented Austria as ambassador at various European courts between 1801 and 1809. In the latter year he became Minister of Foreign Affairs. In this capacity he negotiated the marriage of the Archduchess Marie Louise with Napoleon, and conducted her to Paris. In 1813, after the French reverses in Russia, Austria gave in her adhesion to the other allied powers, and declared war against France. From this period the policy, not only of Austria, but in a great measure that also of the leading Continental powers, was shaped by Metternich. He was one of the plenipotentiaries who signed the Treaty of Paris, and he presided at the Congress of Vienna (1814). The object of his policy was to arrest the progress of what were called revolutionary principles. With this view he formed the scheme known as the Holy Alliance.—BIBLIOGRAPHY: G. A. C. Sandeman, *Metternich: Life and Career*; G. B. Malletson, *Life of Prince Metternich*.

Metz (mets), a town of France, capital of the department of Moselle, on the Moselle. The major part of the town stands on a height within the fortifications, outside of which there is a series of strong detached forts. The cathedral is a late Gothic structure, surmounted by a spire of open work 397 feet high. The manufactures consist of woollens, cottons, hosiery, hats, muslin, glue, and leather. A battle was fought under its walls between the Germans and French in Aug., 1870; the Germans subsequently invested it, and, being reduced to a state of famine, on 28th Oct. it capitulated with 180,000 officers and men under the command of Marshal Bazaine. It was included in the cession of territory to Germany at the peace of 1871, but was restored to France by the Treaty of Versailles (1919). Pop. 68,598.

Meu, or Bald-money, *Meum athamanticum*, an umbelliferous herb with very finely divided foliage, common at high levels in Britain.

Meung, Meun, or Mehun (meun), Jean de, a French poet, surnamed from his lameness *Chopinelle*, was born at Meung sur Loire about 1250, died about 1322. He lived at the court of Philippe le Bel, and enjoyed a high reputation as a scholar, a poet, and a satirist. His principal work was his continuation of the *Roman de la rose*, which Guillaume de Lorris had left unfinished in 1237. To the 4000 verses of his predecessor Meung added about 18,000. In respect of quality, however, his work is less poetical than that of Lorris.

Meurthe (meurt), a river of France, which rises in the Vosges, and joins the Moselle near Nancy; total course, about 100 miles.

Meurthe-et-Moselle (meurt-e-mo-zel), a department of North-East France, formed in 1871 by uniting portions of the old departments of Meurthe and Moselle, in consequence of the

cession by France to Prussia of a portion of her territory on the east under the Treaty of Frankfurt (10th May, 1871); area, 2036 sq. miles. The chief river is the Moselle. Wheat, oats, barley, and fruit are raised; wine-growing is extensive, iron ore and salt are produced. Among manufactures are machinery, woollens, and cottons, glass, paper, earthenware, and leather. The capital is Nancy. Pop. 508,870.

Meuse (meuz; Du. *Maas*), a river of Western Europe, rising in France, in the south of the department of Haute-Marne, and flowing through France, Belgium, and Holland. Its principal affluents are the Sambre, which joins it on the left at Namur, and the Ourthe, which joins it on the right at Liège. At Gorkum it joins the Waal, one of the arms of the Rhine, and gives its name to the united streams. It is divided near Dordrecht into two great rivers, the one of which bends round to the north and reaches Rotterdam; the other branch continues west; and shortly after the two branches again unite and discharge themselves into the North Sea. Its length is 575 miles, of which 305 are in France and 120 in Belgium. It is navigable for about 400 miles. The principal towns on its banks are Namur, Huy, Seraing, Liège, Maastricht, Rotterdam, Schiedam, and Vlissingen.

Meuse, a north-east department of France, drained by the Meuse; area, 2408 sq. miles. Iron is extensively worked; cereals and beetroot are raised; horse-breeding is important. A large area is afforested. The department was prominent in the European War, a large area being completely devastated, particularly around Verdun. Bar-le-Duc is the capital. Pop. 207,309.

Mexborough, a town of the West Riding of Yorkshire, England, on the Don; served by the Midland and Great Central Railways. Iron-works and potteries are the main manufacturing industries. Coal-mines are located near by. Pop. (1921), 15,410.

Mexico, a country in the southern part of the North American continent, bounded by the United States and Central America, and with an extensive coast-line on both the Pacific (2000 miles) and the Atlantic (1500 miles, on the Gulf of Mexico); area estimated at 767,200 sq. miles. Nearly one-half of this territory lies within the torrid zone, but the peculiar geological structure of the republic, that of an elevated plateau rising into volcanic peaks, supported by the two branches of the Mexican Cordilleras, the North-East and North-West, causes the greatest diversity of climate. The principal summits, all of volcanic origin, are Popocatepetl (Smoking Mountain), 17,884 feet; Citlaltepetl (Star Mountain), 18,300 feet; Ixcachhuatl (White Lady), 17,000 feet. All above the limit of perpetual snow,

which is here about 15,000 feet. The largest river is the Rio Grande del Norte, forming part of the boundary with the United States; most of the others are rather insignificant. Among lakes are Chapala, at an altitude of 6000 feet (area, 1500 sq. miles), and Parras in Coahuila, on the headwaters of the River Nazas.

• **Agriculture.**—Mexico is a country of great natural resources, and its three distinct zones of climate—that of the hot coast-lands, the temperate zone, and the 'cold' country of the elevated plateaux—permit the cultivation of almost all the plants of the world. The principal agricultural products are maize (1,030,121 tons in 1918), maguey (*agave*, from which *pulque*, the national beverage of the Mexicans, is produced), cotton, henequen, wheat (387,522 tons in 1910), coffee, beans, chicle (raw chewing-gum), and rubber. Sugar and molasses to an annual value of about £2,500,000 are also produced. Timber and fine wood are found in the southern states and on the coast, and include numerous dyewoods, ebony, mahogany, sandalwood, rosewood, oak, and pine. The vine flourishes in the north, and a fair quality wine is produced.

Mining.—Mining, the principal industry, is carried on all over Mexico as far south as the state of Oaxaca, and great sources of mineral wealth are so far undeveloped, chiefly through bad transport facilities and political unrest. Gold, silver, copper, lead, zinc, mercury, antimony, graphite, tungsten, tin, arsenic, manganese, and molybdenum (27,371 Km. in 1918, but only 648 Km. in 1920) are all actively worked. Coal is extensively worked, 1,000,000 tons being mined annually before the Revolution.

Oil.—Mexico is one of the world's greatest oil-producing countries, and the Constitution of 1917 makes the Government control over oil deposits absolute (Article 27). The principal oil-fields are near Tampico, in the Elbano district; others exist in the Panuco, Tuxpan, and Huasteca districts. The potential production is about 1,250,000 barrels daily. There are 343 wells (1919).

Towns.—Mexico City is the state capital. Vera Cruz and Tampico, both on the Gulf of Mexico, are the principal seaports, but much oil is exported through the Port of Tuxpan.

Railways.—After 1918 the control of the entire railway system was taken over by the Government for military purposes, and only one (the Mexican Railway (520 miles) connecting the capital with Vera Cruz) has been returned.

Administration, &c.—The republic is divided into twenty-eight states, two territories, and what is called the Federal District. It comprises Mexico, the capital of the

a small portion of adjoining territory. The population in 1910 was 15,042,307, now estimated at about 15,500,000. The Creoles are naturally the dominant race, and the Spanish language is generally spread over Mexico. Roman Catholicism is the prevailing religion, but under the Constitution of 1917 Church and State are separate and toleration of all other religions is guaranteed, but no religious body can own landed property. Primary education is free, compulsory, and secular, but the law is not strictly enforced. The present form of government is that of a Federative Republic, divided into states, each with Governor, legislature, and judicial officers, similar to those of the Federation. The supreme executive power is vested in a President, who has powers very similar to those of the President of the United States. The legislative power is vested in a Congress, comprising a Senate (fifty-eight members, two for each state) and a House of Representatives, to which one member is elected, for two years, per 60,000 inhabitants. The President is nominally elected for four years by direct popular vote.

History.—Prior to 1521 Mexico was inhabited by an Aztec race and ruled by native emperors. (See *Aztecs*.) This race had attained a remarkable degree of civilization, and interesting remains of their architecture are existent in the *teocallis* or pyramids of Cholula, Puebla, and Papantla. In 1521 Mexico fell into the hands of the Spaniards under Hernando Cortez. Cortez called it *New Spain*, and was created captain-general, but in 1535 was displaced by a viceroy. From that date till 1821 the country was one of the viceroyalties of Spanish America, and governed by a series of viceroys possessed of almost absolute power. The spirit of discontent engendered by the selfishness of the Spanish rule manifested itself in open rebellion, when in 1808 the deposition of King Ferdinand by Napoleon and the unsettled state of affairs in Spain afforded an opportunity. This rebellion, begun by a priest, Hidalgo, and continued with more or less vigour till 1821, secured in that year the independence of Mexico. After an unsuccessful attempt to secure a Bourbon prince for the throne, General Augustin Iturbide, the chief of the insurgents, caused himself to be proclaimed emperor, 18th May, 1822, under the title of Augustin I, but was forced to abdicate, March, 1823. The republic was proclaimed in 1824. The republican form of government has been interrupted by civil war, numerous dictatorships, and by the brief rule of the Austrian Archduke Ferdinand Maximilian as emperor from 1864 till his execution in 1867, when Benito Juarez assumed power. General Porfirio Diaz (died 2nd July, 1915) ruled the country from 1876 until 25th May, 1911 (excepting 1880-4, General

Manuel Gonzalez), when he resigned. Francisco I. Madero became President until 23rd Feb., 1913, when he was murdered, and General Victoriano Huerta became President. Civil war broke out in April, 1913, and Carranza became President on the fall of Huerta. A resumption of civil war in April, 1920, resulted in the death of Carranza and the election of General Adolfo de la Huerta (May, 1920), until (Sept., 1920) the popular election returned General Alvaro Obregon, who assumed office on 1st Dec. of that year.—BIBLIOGRAPHY: J. H. Smith, *The War with Mexico*; Lewis Spence, *Mexico of the Mexicans*; P. H. Middleton, *Industrial Mexico, 1919: Facts and Figures*; A. J. Paul, *Hygiene in Mexico*; W. H. Prescott, *History of the Conquest of Mexico*.

Mexico, capital of the Republic of Mexico, is situated within the state of Mexico in the Federal District, about 7,400 feet above the level of the sea. It is located at about an equal distance from Vera Cruz on the Mexican Gulf, and Acapulco on the Pacific, and is built on the site of the ancient city of Tenochtitlan, which was destroyed by the Spaniards in 1521. The cathedral, forming one of the sides of the central square, was founded in 1572 and completed in 1791. The Palace of Government and the National Museum are also important. The manufactures are comparatively limited, and the trade is mostly in the hands of foreigners. Pop. estimated at over 400,000.

Mexico, an inland state of the Mexican Republic. It lies in the south of Mexico, and forms an elevated region (Nev. de Toluca, 14,977 feet), one of the best cultivated and most thickly peopled parts of the republic. It embraces within its boundaries, but outside its administrative sphere, the city and Federal District (587 sq. miles; pop. 703,500) of Mexico. Toluca (pop. 30,000) is the capital. Area, 9230 sq. miles; pop. about 1,000,000.

Mexico, Gulf of, a large bay or gulf of the Atlantic, oval in form, and nearly surrounded by a continuous coast-line 3000 miles in length, of the United States and Mexico; estimated area, 800,000 sq. miles. It gives name to the Gulf Stream, which issues from it by the Strait of Florida.

Meyerbeer (mî'ër-bâr), Giacomo, musical composer, born in Berlin 1791, died at Paris 1864. His first two operas, *Jephtha's Vow* (1813) and *Abimelek*, the one produced at Munich and the other at Vienna, having failed, he went to Italy. There he rapidly composed a series of operas in the Italian style, which were generally well received. In 1826 he went to Paris. There he produced *Robert le Diable* (1831), *Les Huguenots* (Paris, 1836), *Le Prophète* (1849), *Pierre le Grand* (*L'Étoile du Nord*, 1854), *Le Pardon de Ploermel* (*Dinorah*, 1858), and *L'Africaine* (1865).

In these Parisian operas he ceased to be an imitator of the Italians, and it is upon them that his fame as a composer is founded.—Cf. A. Hervey, *Meyerbeer*.

Meze'reon (*Daphne Mezereum*), a well-known shrub grown in gardens, having fragrant pink flowers that appear in spring before the leaves, and are followed by red and poisonous berries. The bark is exceedingly acrid, and has been used in medicine.

Mézières (mâ-zyâr), a town of France, capital of the department of Ardennes, on the Meuse. Captured by the Germans during the European War (Sept., 1914), it was retaken by the Allies in Nov., 1918, but destroyed before and bombarded for twenty-four hours after the German evacuation. It was 'adopted' by Manchester. Pop. about 10,000.

Mezzotint is a method of engraving in which a copper plate is first covered with a series of fine indentations, each having a burr, by means of a *rocker* with a curved and serrated edge. From this surface, which would print black, the engraver removes the burr with a *scraper*, in proportion to the degree of lightness required; thus reversing the other engraving processes, and working from dark to light. When combined with other processes, such as etching or aquatint, mezzotint is known as mixed mezzotint. Its inventor was Ludwig van Siegen (1609 to after 1676), and the process was practised by Prince Rupert. In their day the engraver left untouched the parts of the plate which were to print light, and roughened only the darks; but W. Vaillant (a Frenchman said to have been an assistant to Prince Rupert) appears sometimes to have used the rocker, which was systematically used by Abraham Bloteling (1640-90). In the eighteenth century the art became very popular, especially in England, and for reproductive purposes. The most prominent figures of the period are James M'Ardell (1729-65), one of the first engravers to work to a considerable extent after Reynolds; Richard Earlom (1743-1822), whose 200 plates in etching and mezzotint after Claude's *Liber Veritatis* are a forerunner of Turner's *Liber Studiorum*; Valentine Green (1739-1815); Thomas Watson (1748-81); and John Raphael Smith (1752-1812). In the early nineteenth century, the work of William and James Ward, Charles Turner, and S. W. Reynolds is important; and David Lucas (1802-81) produced a series of masterly plates after John Constable. The development of photogravure has largely killed mezzotint; but among modern artists Sir Frank Short has produced some remarkable plates.—Cf. A. M. Hind, *Short History of Engraving and Etching*.

Miao-tse, or Miao-Tse, a race of people found in the valleys of Yunnan, Kweichow, Kwang-

tsé, and Kwang-tung in China. They are one of the aboriginal tribes of the country, and number several millions. Some of the tribes are under Chinese rule, but others retain their independence.

Mica, a group of common mineral silicates crystallizing in six-sided plates of the monoclinic system, with a perfect basal cleavage, so that they split easily into thin flexible laminae, having a shining, pearly, and almost metallic lustre. The magnesium-micas are optically almost uniaxial, and were on this account long regarded as belonging to the hexagonal system. The platy crystals are often large, having been found 9 feet across in Canada, and they are employed in Russia for window-panes, and in that state are called *muscovy-glass*. The mica are mostly developed in igneous rocks, such as granite and diorite, or by the metamorphism of argillaceous masses, as in mica-schist. They are also found in many sedimentary rocks, as shales and sandstones, giving them their laminated texture. In the latter case the mica is derived from the disintegration of the crystalline rocks. The micas are essentially hydrous aluminium potassium silicates. The common colourless species *muscovite* is free from magnesium and iron; but these are important constituents in the darker mica *biotite*, which frequently decomposes into chlorite. The flexibility and elasticity of cleaved plates of muscovite cause it to be used for lamp-glasses and shades. Mica is also worked up into non-conducting boards for electrical apparatus, and is employed to give lustre to wall-papers.

Micah, the sixth of the minor prophets, a member of the tribe of Judah. He prophesied in the reigns of Jotham, Ahaz, and Hezekiah, and was a contemporary of Isaiah. His style is pure and correct, his images bold and vivid.

Mica-Schist, or Mica-Slate, probably the commonest of metamorphic rocks, composed of mica and quartz; it is highly fissile and passes by insensible gradations into clay-slate. It is a product of the alteration of shale by heat, or pressure, or both, acting together in the earth's crust. The mica is usually muscovite, but biotite-schists occur, weathering to a golden brown on their surfaces of parting. Almost all mica schists include almandine garnet, developed during the metamorphism of the original sediments. The foliation very often records the bedding of the shales; but in other cases it has developed parallel to surfaces of shear.

Michael, St. (Heb., 'he who is equal to God'), in Jewish theosophy, the greatest of the angels (*Dan. x. 13, 21; xii. 1*), one of the seven arch-angels. In the New Testament he is spoken of as the guardian angel of the Church (*1 Pet. i. ver. 9; Rev. xii. 7*). There is a festival of Michael

and All Angels in the Western Church, held on 29th Sept.

Michaelmas, the feast of St. Michael the Archangel. It falls on the 29th of Sept., and is supposed to have been established towards the close of the fifth century, in consequence of an apparition of the archangel which took place on Monte Gargano in Apulia in 493. In England, Michaelmas is one of the regular terms for settling rents.

Michelangelo (Michelangiolo Buonarroti), a descendant of the ancient family of the Counts of Canossa, born at Caprese, in Tuscany, 1475, died at Rome 1563; a distinguished Italian painter, sculptor, architect, and poet. He studied drawing under Domenico Ghirlandajo, and sculpture under Bertoldo at Florence, and having attracted the notice of Lorenzo de' Medici, was for several years an inmate of his household. Having distinguished himself both in sculpture and painting, he was commissioned (together with Leonardo da Vinci) to decorate the Senate-hall at Florence with an historical design, but before it was finished, in 1505, he was induced by Pope Julius II to settle in Rome. Here he sculptured the monument of the pontiff (there are seven statues belonging to it) now in the church of St. Pietro in Vincoli; and painted the dome of the Sistine Chapel, his frescoes representing the creation and the principal events of sacred history. In 1530 he took a leading part in the defence of Florence against Charles V. Three years later he began his great picture in the Sistine Chapel, *The Last Judgment*, which occupied him eight years. His last considerable works in painting were two large pictures: *The Conversion of St. Paul* and *The Crucifixion of St. Peter* in the Pauline Chapel. His *Madonna and Saints* and *The Entombment of Christ* are in the National Gallery. In sculpture he executed *The Descent of Christ from the Cross*, four figures in one piece of marble. His statue of *Bacchus* was thought by Raphael to possess equal perfection with the masterpieces of Phidias and Praxiteles. As late as 1546 he was obliged to undertake the continuation of the building of St. Peter's, and planned and built the dome, but he did not live long enough to see his plan finished, in which many alterations were made after his death. Besides this, he undertook the building of the Piazza del Campidoglio (Capitol), of the Farnese Palace, and of many other edifices. His style in architecture is distinguished by grandeur and boldness, and in his ornaments the untamed character of his imagination frequently appears, preferring the uncommon to the simple and graceful. His poems, which he considered merely as pastimes, contain, likewise, convincing proofs of his great genius. The chief inspirer of his poetry was the pious and accomplished lady

Vittoria Colonna, widow of the Marquis Pescara. His prose works consist of lectures and speeches. — Cf. J. A. Symonds, *The Life of Michelangelo*.

Michélet (mêsh-lâ), Jules, a French historian and miscellaneous writer, was born in Paris in 1798, died at Hyères in 1874. In 1821 he was called to the chair of history in the Collège Rollin, where he was also professor of ancient languages and of philosophy till 1826. After the Revolution of 1830 he was appointed chief of the historical section of the archives of France, and in 1838 became professor of history at the Collège de France. He lost all his offices at the *coup d'état* in 1851. His principal historical works are: *Histoire de France* (18 vols., 1833-66), *Histoire de la Révolution française* (7 vols., 1847-53), *Histoire romaine*, *Précis de l'histoire moderne*, *Précis de l'histoire de France jusqu'à la révolution*, and *Origines du droit français*.

Michigan, the 'peninsula state', a north-central state of the United States, divided by Lake Michigan into two separate peninsulas, one projecting eastwards from Wisconsin, and the other projecting northwards from Indiana and Ohio to their common meeting-point, Mackinac Strait. The state is drained by the Kalamazoo and other rivers, which are generally tapped for water-power. Lansing (pop. 1920, 57,327) is the state capital; but Detroit, fourth city of the United States (pop. 1920, 993,678) is the largest town. Others are Grand Rapids (1920, 137,634), Flint (1920, 91,599), and Saginaw (1920, 61,003). The inhabitants are mainly white, with some negroes and Asiatics. There is an Indian Reserve; area (1919), 191 acres; pop. 7512. Michigan is largely an agricultural state, producing oats (50,430,000 bushels in 1920), corn, wheat, hay, potatoes, beans, and sugar-beets. Dairying (butter and cheese production) is extensive, and sheep-farming is progressive. The state ranks sixth in mineral wealth, iron ore and copper (Lake Superior region), silver, salt, clay, coal, graphite, gypsum, and a small quantity of petroleum being produced. Fisheries on the Great Lakes are valuable (25,000,000 lb. average annual catch). Among manufactures are machinery and automobiles (of which Michigan manufactures about 75 per cent of the total American output); abattoirs and canneries are prominent. 8982 miles of steam and 947 miles of electric railroad track traverse the state (1919), and St. Mary's Falls Ship Canal ('Soo' Canal) provides inter-lake communication. Education is free and compulsory between seven and sixteen years of age. The University of Michigan (founded 1841) is located at Ann Arbor, the State Agricultural College (founded 1837) at Lansing, and at Houghton there is a College of Mines (founded

1886). Area, 57,980 sq. miles (500 sq. miles of water); pop. (1920), 3,607,222.

Michigan was settled in 1668 by French colonists of Marquette's Jesuit Mission (Sault de Ste Marie), and remained under French control until 1760-1, when it fell to the British. In 1805 it became a separate territory, and was admitted to the Union as a state, 26th Jan., 1837. The present Government comprises a Governor (elected for two years), a Senate (32 members elected by counties or county groups for two years), and a House of Representatives (100 members). The electoral districts are redistributed every ten years on a population basis. Two Senators and thirteen Representatives are sent to Congress. For local government there are eighty-three counties, each a corporate body with a Board of Supervisors in administrative power.—BIBLIOGRAPHY: L. H. Wood, *Physical, Industrial, and Sectional Geography of Michigan*; H. M. Dilla, *The Politics of Michigan*.

Michigan, Lake, the second largest of the great lakes of North America. It is wholly within the United States. On the north-east it communicates with Lake Huron by the narrow strait of Mackinac. It is over 320 miles long, and on an average 60 miles broad; area, estimated at 23,000 sq. miles. The lake is 580 feet above sea-level; the greatest depth is 865 feet.

Michigan City, a city of Indiana, United States, on the south shore of Lake Michigan. It has a large timber trade. Pop. (1920), 19,457.

Michoacán, a maritime state of Central Mexico, on the Pacific coast. It is mountainous (Patamban, 12,300 feet; Tancitaro, 12,061 feet), and is watered by the Rio de las Balsas and its tributary the Tepalcatepec. Cereals, sugar, coffee, and tobacco are raised; gold, coal, silver, and lead are mined. Morelia is the capital. Area, 22,621 sq. miles; pop. (estimated), 1,003,490.

Microcline, a potassium felspar of the same composition and general characters as orthoclase, but crystallizing in the triclinic system. A great deal of what was formerly regarded as orthoclase in granite is now known to be microcline.

Micro-farad, the practical unit of electrical capacity, being the millionth part of a farad (q.v.).

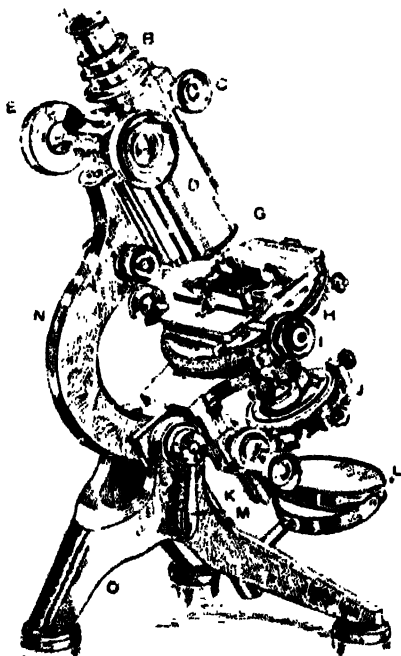
Micrometer. See *Tolerance*.

Micronesia, a division of Oceania (q.v.).

Microphone, an instrument invented by Hughes in 1878, and employed in the electrical transmission of sound. It consists, in its original and simplest form, of a rod of carbon loosely pivoted between two blocks of carbon provided with sockets to hold the pointed ends of the rod. The carbon blocks are fixed on a sounding-board or box, connected to a small battery and a telephone receiver. When sounds are produced

in the neighbourhood of the microphone, they set up vibrations which disturb the state of the electrical contacts at the ends of the rod. The movement of the rod causes changes of resistance of the microphone, and the current undergoes equally rapid variations in strength, with the result that the sound made near the microphone is reproduced more or less distinctly by the telephone. Hughes also discovered that the microphone was sensitive to electrical impulses, and detected electrical waves by means of his instrument up to a distance of about 500 yards. The imperfect-contact detector of electrical waves was reinvented by Branly under the name of the coherer. The microphone is employed as a transmitter of speech in the telephone service; in the Hunnings' transmitter a quantity of granulated coke carbon is held loosely between two metal or carbon surfaces situated behind the mouth-piece.

Microscope, an optical instrument for producing and observing magnified images of small



Microscope

A, Eyepiece. B, Draw-tube. C, Rack adjustment for draw-tube. D, Body. E, Coarse adjustment. F, Fine adjustment. G, Objective. H, Stage (revolving). I, Traversing motion for stage. J, Sub-stage (for condenser, &c.). K, Adjusting screws for sub-stage. L, Mirror. M, Lever for clamping microscope at any angle. N, Limb. O, Stand.

objects. In its simplest form it consists of a single convex lens, near which the object to be examined is placed (see *Lens*). The lens

is, however, subject to the defects of spherical and chromatic aberration, which cause respectively distortion and colouring of the image, but these errors were largely obviated by using two or three weaker lenses at a distance apart. Wollaston's *doublet* (1820) consisted of two plano-convex lenses, one three times as strong as the other, with their plane sides towards the object, and the weaker lens next the eye. Doublets and triplets were devised by Chevalier, Brücke, Herschel, and others, magnifications from 10 to 70 being obtained with these developments of the simple microscope. The *compound microscope* contains two lenses or systems of lenses, viz. an object-glass or *objective*, and an *eyepiece* or ocular. The object is placed on the *stage* at a distance from the objective greater than the focal length of the latter, and a real, inverted, and magnified image is formed in the focal plane of the eyepiece, which forms a virtual and magnified image of the first image. When a negative or Huygenian eyepiece is used, the rays proceeding from the objective converge to form an image behind the field lens of the eyepiece, which is adapted to focus converging rays. The improvements of the compound microscope date from the beginning of the nineteenth century. Chromatic aberration was reduced by placing in contact a diverging lens of flint glass and a converging lens of crown glass. Spherical aberration was also removed by the correct relative placing of the achromatic elements of the objective according to principles given by Lister (1830). *Aplanatic* objectives were thus realized, i.e. objectives which bring all the rays to one focus. Later, much progress was made by improvements in the manufacture of glass. In the earlier forms of achromatic combination referred to, it was only possible with two lenses to achromatize two colours, owing to the different dispersive powers of flint and crown glass. But Abbe of Jena, in conjunction with Schott and Zeiss, produced a series of new varieties of glass from which it was possible to form combinations of lenses which gave images almost entirely free from colour. The new objectives made from these glasses were termed *apochromatic* objectives. The eyepiece generally supplied with a microscope is of the Huygenian type, as it is nearly free from spherical and chromatic error. When measurements of an object are to be made, a Ramsden eyepiece is used with a fine scale in its focal plane. With high magnifications, optical improvement is obtained by using the method of *oil immersion*. A drop of cedar oil is placed between the cover-glass of the slide and the lower plane surface of the objective, thus giving an optically homogeneous medium between object and objective. The oil has the same refractive index as the glass, and its use results in an increase of the effective aperture of the objective; the method is termed

one of homogeneous immersion. The magnifications employed vary from 12 to 1200. The tendency in recent years is to concentrate on obtaining as perfect an image as possible with the object-glass, and to leave a greater share of the magnification to be provided by the eyepiece. To secure such perfect images it must be possible to bring the objective exceedingly close to the object, so as to obtain high effective aperture. The homogeneous immersion system secures this very efficiently. For this reason the old $\frac{1}{10}$ -inch air objective has given place to the $\frac{1}{2}$ -inch oil-immersion lens, with better results and a great reduction in price.—BIBLIOGRAPHY: W. B. Carpenter, *The Microscope*; E. J. Spitta, *Microscopy*.

Microspore. See *Heterosporry*.

Midas, in Greek mythology, the son of Gordius and Cybele, and King of Phrygia, whose request that whatsoever he touched should turn to gold was granted by the god Dionysus (Bacchus). In this way even his food became gold, and it was not until he had bathed in the Pactolus that the fatal gift was transferred to the river. Another legend is that, in a musical contest between Pan and Apollo, Midas, who was umpire, decided in favour of the former; whereupon the angry Apollo bestowed upon the presumptuous critic a pair of ass's ears.

Middelburg, a town of Holland, capital of the province of Zeeland, near the middle of the Island of Walcheren. It is an ancient place, and was taken by the Dutch from the Spaniards in 1574. Pop. 19,500.

Middle Ages is the term used sometimes for the whole period between the fall of the Roman Empire in the west (for which A.D. 476 is usually taken as a convenient date) and the Renaissance of the end of the fifteenth century, and sometimes for the later portion of that period, the years from the end of the fifth to about the middle of the tenth century being described as the Dark Ages. An outline of the political history of both the Dark Ages and the Middle Ages (in the narrower sense) will be found under *History*. The most notable event in the social history of the Dark Ages was the rise of the Empire of Charles the Great (768-814), which put an end to a long era of barbaric warfare, and introduced new ideals of government and civilization. The break-up of the Carolingian Empire in the ninth century was followed by a reversion to barbarism. Weak kings failed to maintain the administrative machinery created by Charles the Great, the lawless rule of greedy and merciless nobles was the source of widespread oppression and misery, the Church was corrupt and degenerate, and fresh hordes of barbarian invaders—Normans in the north-west of Europe, Saracens in the south, Slavs and Magyars in Central Europe—attacked

what had been the Empire. The barbarians were ultimately defeated, but their defeat was accomplished by the feudal nobility which was itself the greatest obstacle to internal good government, and it was followed by the establishment of the feudal system all over Europe. Society between the tenth and the twelfth century came to be based on a system of land tenure, largely military in origin, which profoundly influenced every department of administrative life, and involved the complete dependence of the lower classes of the community upon the owners of the lands which they held, or on which they worked as serfs. Coincidentally with this development there came the division of Europe into separate states, and, as the conception of the state progressed, each country experienced a struggle between the central power and the feudal barons, whose aim was decentralization or anarchy. The conflict went on through the Middle Ages, and the victory of the principle of centralization was not complete at their close, for international warfare, the struggle between the Papacy and the Empire, and the Crusades all tended to preserve the power of barons who commanded their own fighting forces. In England the monarchy was powerful enough to bring the barons into subjection long before a similar result was attained in France, while in Germany feudalism crystallized into a series of small dominions uncontrolled by any central power. The growth of commerce led to the establishment of independent municipal states, the most important of which were the Free Towns of the Empire and the cities of the north of Italy. Serfdom survived the Middle Ages alike in England, France, and Germany, though it had disappeared in Scotland.

In religious history the period witnessed many important movements. At the beginning of the Dark Ages only a small portion of Europe had been converted to Christianity, and the process of conversion forms a large part of the history of the time. It was completed by the expansion of German influence in the east of Europe in the eleventh and twelfth centuries. Contemporaneously with the growth of Christianity, the Dark Ages witnessed the rise of Islam, which is dated from the flight of Mahomet to Medina in A.D. 622, after which Mahomedanism spread with amazing rapidity. In the Christian Church there was a succession of religious revivals, beginning with the reformation of monastic life by St. Benedict in the early sixth century, which gave an immense impetus to the foundation of monasteries. These deeply affected not only religious but also social and economic life by the provision which they made for the poor and by their enterprise in agriculture and even in commerce. There was another revival in the tenth century,

associated with the monastery of Cluny (near Macon, in Burgundy), and in the eleventh century the Cluniac movement led to a general Reformation in the Church all over Europe, accompanied by an advance in the power of the Papacy. A third revival dates from the thirteenth century, when St. Francis of Assisi and St. Dominic founded orders of mendicant friars whose aim was not contemplative life in monastic seclusion, but the care of the sick and the preaching of the Gospel to the poor. The appearance of the friars in the thirteenth century gave to conservative religious opinion much the same shock as the Wesleyan preachers did in the eighteenth or the Salvation Army in the nineteenth century. The influence of the Church decreased towards the end of the Middle Ages, owing to the degeneration of the monastic orders and of the friars, and also through a series of schisms in the Papacy and its subordination to French policy during the residence of the Popes at Avignon (known as the 'Babylonish Captivity', 1305-78). The Great Schism began in 1378, and was closed by the Council of Constance in 1415.

The intellectual life of the Middle Ages was marked by two great revivals of learning. The first of these was connected with the court of Charles the Great, who, like Alfred of England about a century later, was a patron of scholars, whom he gathered round him and to whose discussions he listened. The second was the classical renaissance in the twelfth century, with which is connected the rise of European universities. Intellectual life is also illustrated by a large number of mediæval poems in all languages, by treatises on the problems of religion and philosophy, and by advances in ecclesiastical and domestic architecture, in the methods and aims of commerce, and in the art of war. Archery was brought to perfection by the English, and gunpowder was invented in the early fourteenth century, and was freely used in warfare before the end of the Middle Ages. There was also a considerable development in shipbuilding (especially in the size of vessels), and in the use of water-ways for internal communications. Canals were introduced in Holland and Belgium in the twelfth century, and rivers, as means of communication, were much more important than the ill-made tracks which served as roads. Above all, the Middle Ages were a great period in the history of painting. Perhaps the best general characterization of Europe in the later Middle Ages is that given by the late Professor York Powell: "A knot of states whose commerce, regulated by self-governing guilds, flowed westward from the great Italian trading republics, through the fairs of France and Germany, to the marts of Flanders and the ports of England and Gascony . . . and the Baltic. Europe was a set of

kingdoms governed by curious half-feudal, half-free, half-despotic constitutions, in which local feelings were everywhere strong, but centralization everywhere welcome. . . . In these states dwelt a succession of generations who invented no single tool, implement, or art, who with rarest exceptions were wholly ignorant of the sciences of the past, and disliked the very dreams of the sciences that were to come, but who could . . . show, amid squalor, dirt, and misery, a true and unflinching taste in every article of daily life. A state of society ignorant, cruel, and superstitious . . . but withal a state of society in which men were earnest, dutiful, and hardworking, and which could display such noble types of character as the untiring and unselfish Francis, the friend of the poor and helpless, . . . and the saintly King Louis."—BIOGRAPHY: Sir C. W. C. Oman, *The Dark Ages*; T. F. Tout, *The Empire and the Papacy*; Cambridge *Mediæval History*; E. M. Tappan, *In Feudal Times: Social Life in the Middle Ages*; Ch. Seignobos, *History of Mediæval and Modern Civilization*.

Middlesborough, a river-port, municipal and county borough of England, on the Tees and in the North Riding of Yorkshire. It is served by the North Eastern Railway. There are numerous blast-furnaces and rolling-mills, foundries, engineering-works, and ship-yards. Salt is extensively worked. There is an extensive harbour. The borough was incorporated in 1853, and returns two members. Pop. (1921), 181,103.

Middlesex, the metropolitan county of England, formerly containing the greater portion of London (now a county by itself); area, 148,602 acres. Brentford is the county town. The district is almost entirely covered with urban districts and towns, all suburbs of London. Pop. (1911), 1,126,604; (1921), 1,253,164.

Middleton, Thomas, English dramatist, was born about 1570, and died in 1627. Very little is known about his life. He was City Chronologer from 1620 until his death, when he was succeeded by Ben Jonson, who in 1618 had mentioned him to Drummond of Hawthornden as "a base fellow". This is almost all that is known about him. He frequently collaborated with other dramatists, especially with Rowley and Dekker. His earliest printed play was *Blurt, Master Constable* (1602), a light comedy. Two interesting prose tracts, *Father Hubbard's Tale* and *The Black Book*, appeared in 1604. Amongst Middleton's plays may be mentioned the following: *The Phoenix*; *Michaelmas Term* (1607); *A Trick to catch the Old One* (1608); *The Family of Love*, a weak satire on the Puritans (1608); *Your Five Gallants*; *A Mad World, my Masters*; *The Roaring Girl* (written with Dekker, 1611); *A Chaste Maid in Cheapside*; *The Witch*; *The Mayor of Quinborough*; *The Changeling*; *The Spanish Gypsy*;

and *A Game at Chess*. It is unlikely that Middleton wrote a highly incompetent paraphrase of *The Wisdom of Solomon*. *Microcynicon, Six Snarling Satires* (1599) may be his work. Middleton wrote with much fluency, and his plays were written under the uncomfortable necessity of having to get them finished by a fixed date. Yet much of his work is memorable and some supremely good. *The Changeling* is perhaps his masterpiece, and in one scene (the conversation between De Flores and Beatrice after the murder of Alonzo) he surpasses Webster and Tourneur, and is momentarily on a level with Shakespeare. *The Witch* is interesting on account of its resemblances to *Macbeth*, which was probably written earlier; some of the songs from Middleton's play were interpolated into *Macbeth* by the players. *A Game at Chess* is an altogether excellent play, and is perhaps the most Aristophanic comedy in English. Under the thin disguise of pieces and pawns, the characters of the play were those English and Spanish personages who were involved in the matter of the Spanish marriage. Gondomar, the Spanish Ambassador, who was satirized as the Black Knight, got a stop put to this play after a run of nine days. The play was an instant success, and in spite of its short run it brought in £1500, an immense sum for those days. Middleton was fined and perhaps also imprisoned. In this play, which is a criticism not of city manners and customs, but of diplomacy and international politics, Middleton reaches a height to which he never before attained in comedy.—BIBLIOGRAPHY: A. C. Swinburne, *The Age of Shakespeare*; P. G. Wiggins, *An Enquiry into the Authorship of the Middleton-Rowley Plays*; Sir A. W. Ward, *History of English Dramatic Literature*.

Middleton, a town of England, in Lancashire, served by the Lancashire & Yorkshire Railway. Extensive cotton, silk, and other works give employment. Pop. (1921), 28,300.

Midge, the ordinary English name given to numerous minute species of flies, resembling the common gnat, but constituting a special family (Chironomidae). The eggs are deposited in water, where they undergo metamorphosis.

Midianites, an Arabian tribe, represented in the Old Testament as the descendants of Midian, son of Abraham by Keturah (*Gen.* xxv, 2), and described as engaged at an early period in a commerce with Egypt. They dwelt in the land of Moab (Arabia Petraea), to the south-east of Canaan. One portion of them inhabited the country on the east of the Dead Sea.

Midnapur, an administrative district and town of Bengal, forming the most southern part of the Bardwan division, bounded on the east by the River Hugli, and with an area of 5186 sq. miles. Pop. (district), 2,822,000; (town), 32,750.

Midrash, the general name given among the Jews to the exposition of the hidden meaning of the Scriptures. It includes any and every ancient exposition on the law, psalms, and prophets. The *Midrash* is divided into the *Halacha*, or the authoritative law laid down in the *Talmud*; and the *Haggada*, or poetical homiletics on the whole body of the Old Testament. The term *midrash* is generally applied to the latter branch of rabbinical literature.

Midshipman, a junior officer in the Royal Navy, ranking between a cadet and a sub-lieutenant. The midshipman's time is principally occupied in receiving instruction, both literary and professional, and his professional duties are continued as a sub-lieutenant. Midshipmen carry a dirk instead of a sword, wear white tabs on the jacket lapel, and mess in the gun-room. The title is derived from their former quarters, amidsthips on the lower deck.

Midsummer Day is the feast-day of the nativity of St. John the Baptist, and is commonly reckoned the 24th of June. On midsummer eve, or the eve of the Feast of St. John, it was the custom in former times to kindle fires (called St. John's fires) upon hills in celebration of the summer solstice. It is also the second quarter-day in England for the payment of rent.

Midwifery. See *Obstetrics*.

Mignonette (min'yon-et; *Reseda odorata*), a well-known fragrant annual plant of the nat. ord. Resedaceae, a native of North Africa. It is largely cultivated in gardens, also in flower-pots, in apartments, and in the boxes which are placed outside windows. There is also a sub-biennial variety, called *tree mignonette*. Weld or dyers' weed, a native of Britain, belongs to the same genus.

Migration of Animals, the phenomenon of certain animals moving, either periodically or at irregular times and seasons, from one locality or region to another, sometimes far distant. Migration has been observed in mammals, birds, fishes, and insects, but it probably occurs in other groups of the animal world, the observation of which is less easy than that of the higher forms. The buffaloes or bisons of North America used to migrate in herds between Canada and Mexico. Many fishes (for example, salmon, lampreys, &c.) make periodical journeys from the sea towards freshwater streams and rivers for the purpose of depositing their eggs; eels descend rivers to breed in the deep sea, from which the young eels (elvers) travel back. The migratory habits of locusts, and those of certain species of ants, &c., exemplify migration among insects; but amongst the birds we meet with the best-marked instances of migration. With sea-birds (for example, puffins) the day of arrival or that on which they appear in certain localities may be

prognosticated with perfect safety; and similarly, the day of departure appears in some birds (for example, swifts) to be almost as accurately timed. Storks have been known to return regularly to their old nests, and the same has been observed of swallows. The mode in which birds migrate varies greatly even in the same species of bird. The swallows migrate in bodies comprising vast numbers, and so also do cranes, wild ducks, geese, and many other forms. The migratory flight is generally made against the wind; but certain species of birds, as quails for instance, appear to wait for favouring winds, and to delay their flight by resting on islands when the wind is unfavourable. Regarding the causes of migration, science cannot at present definitely pronounce. Probably a combination of causes, or different causes in different cases, as scarcity or plenty of food-supply, the powerful influences of temperature, and the influence of the breeding-season, may contribute to the migratory 'instinct'. It has been further suggested by A. R. Wallace that this migratory habit or instinct has gradually been acquired since a time when the breeding- and feeding-grounds of the animals were coincident, these having been gradually separated by climatic and geological changes.

Mil'an (It. *Milano*), an inland province of Lombardy, Northern Italy. It is mainly a canal-irrigated plain, and produces rice, flax, corn, wine, oil, and mulberry trees (for silk-worms). Dairying (production of butter and cheese) is progressive. Milan is the capital. Area, 1221 sq. miles; pop. about 1,834,000.

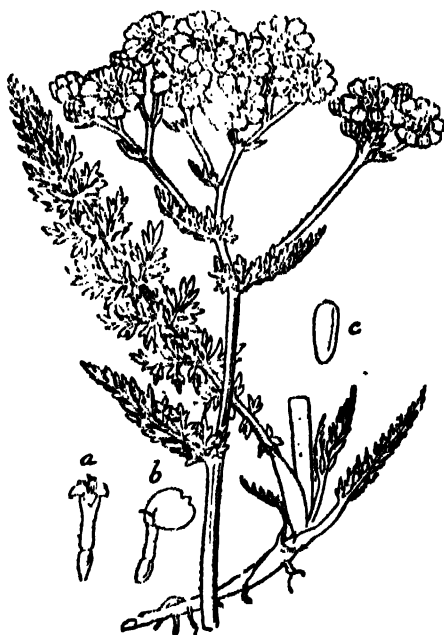
Milan (It. *Milano*; Lat. *Mediolanum*), capital city of Milan, Lombardy, and the second city of Italy, on the Olona, in the middle of the Lombard Plain between the Adda and Ticino. Among the public edifices the first place belongs to the Duomo or cathedral, dedicated to the Virgin, a magnificent structure, inferior only in size to St. Peter's at Rome and the cathedral of Seville. In its present form it was begun in 1387, and was finished between 1805 and 1815 by order of Napoleon. Among other buildings are the Palazzo di Brera or Delle Scienze, Lettere ed Arte, containing the picture-gallery and the library of the academy (300,000 vols.); and the Ambrosian Library, the earliest, and still one of the most valuable public libraries in Europe. There is also a valuable museum of natural history, a conservatory of music, a military college, and a theological seminary. The Galleria Vittoria Emanuele, a covered street, connects the Piazza del Duomo with the Piazza of La Scala Theatre. The chief theatre is La Scala (*Teatro della Scala*), accommodating 3600 spectators. The manufactures include silks, cottons, lace, carpets, hats, earthenware, machinery and metal goods, and jewellery.

The first distinct notice of Milan occurs in 221 B.C., when it was subdued by the Romans. In the third century after Christ it ranked next to Rome. It became a republic in 1101, and, having refused to submit to the Emperor Frederick I., it was destroyed by him in 1162. It was soon rebuilt, but long continued to be torn by internal factions, headed by the leading nobility, among whom the Visconti and the Sforzas were the most prominent. It afterwards belonged with Lombardy to Austria, until 1859, when by the Peace of Villafranca Lombardy was ceded to Piedmont and incorporated in Italy. Pop. (1915), 663,059.—Cf. Ella Noyes, *Story of Milan*.

Milazzo (mi-lat'zō), a seaport of Messina, Sicily, where Garibaldi defeated the Neapolitan troops in his Sicilian campaign of 1860. Pop. 16,000.

Mildew, a name given to various minute Fungi, but properly pertaining only to the parasitic *Erysiphales* and *Peronosporineae* (q.v.).

MIle, a measure of length or distance, used in almost all countries of Europe. The English



Milfoil or Yarrow (*Achillea millefolium*)

a, Disk floret. b, Ray floret. c, Seed.

statute mile contains 8 furlongs, each 40 poles or perches, of $5\frac{1}{2}$ yards. The statute mile is therefore 1760 yards, or 5280 feet. It is also 80 surveying chains, of 22 yards each. The square mile is 6400 square chains, or 640 acres.

The Roman mile was about 1620 English yards. The ancient Scottish mile was 1984 yards = 1.127 English miles; the Irish mile, 2240 yards = 1.273 English miles. The geographical or nautical mile is the sixtieth part of a degree of latitude, or 6080 feet.

Miletus, an ancient city of Ionia, Asia Minor, situated near the mouth of the Meander, one of the chief Greek cities of Asia Minor, birth-place of Thales, Anaximander, Anaximenes, and Aspasia. It had upwards of seventy-five colonies, most of which were on the coasts of the Euxine. The most flourishing period was before its destruction by the Persians, 494 B.C., though it again rose to be a place of some importance.

Milfoil, or Yarrow, the common name of *Achillea millefolium*, nat. ord. Compositæ, a plant which grows commonly on banks, by roadsides, and on dry pastures. It has numerous very finely divided leaves, and corymbs of small, white or sometimes rose-coloured flowers. (See illustration on previous page.)

Milford, or Milford Haven, a seaport of Pembrokeshire, Wales, on the north shore of the inlet called Milford Haven; served by the Great Western Railway. There are docks capable of accommodating the largest vessels, and trade is with Ireland principally. Milford Haven, an opening of the Atlantic Ocean, is considered one of the finest natural harbours in Great Britain.

Military Discipline. Military discipline—and in this connection the word military is used in its broader sense to include all armed forces of the Crown—demands respect for the authority which men recognize when taking service under the State; it demands instant and exact obedience to all orders given by that authority; it requires a mode of life according to certain rules made for the greatest good of the greatest number; and it assumes as an axiom the obvious fact that in any corporate body of men banded together for a definite purpose there must be one head whose word is law and must be obeyed. With regard to the armed forces of Great Britain and Ulster, this head is the king, whose authority, though not exercised directly and constitutionally delegated to the responsible minister of the Crown, descends through officers of various grades holding His Majesty's commission, and through these officers to other subordinates not holding commissions, i.e. non-commissioned officers. This gives the chain of command, in which each link owes obedience to the one above it, and exerts its authority according to well-defined rules over the ones below. In addition to this principle, military discipline takes to itself the power of punishment provided by the Army Act (see *Military Law*), and calls to its aid the sentiment known as *esprit de corps*.

Discipline, like faith, is the better for outward and visible signs, and it is on the necessity for these that untrained opinion is likely to differ. Take as an example the question of 'saluting', than which no outward and visible sign has ever caused more heart-burning. Every free and independent modern man is inclined to argue: "Why should I salute (and by so doing own myself inferior) another who is merely a man like myself, though he may possibly wear a more expensive uniform?" It is in this last word, uniform, that the answer to the question is to be found; it is the uniform which is saluted, or more correctly the king's commission borne by the wearer of the uniform, and not the individual man. The act exemplifies subjection to control, and is the sign of that respect for authority which we all admit. In discussing this question it is well to remember the early days of the Russian Revolution, when one of the first changes made was the abolition of all saluting in the army; this led by natural stages to the lessening of respect for authority, the final disappearance of all discipline, and—chaos.

Discipline to be effective must be strict and exact, though it need not be repressive; there can be no two ways of doing things, and no 'to-morrow'; obedience must be instant and without argument, and must be given cheerfully in the firm conviction that the particular order in question is either directly or indirectly for the general good. Our form of discipline, whatever may be the case in other countries, is not based on fear; rather is it founded on expediency and enforced with sympathy and the human touch, the power of punishment being kept in the background for use if required. Normally we depend very largely for our discipline on an appreciation of the facts, and on a good understanding between officers and men. It is an unwritten law in the services that one of an officer's first duties is to his men; he is their leader in time of emergency; and how can he better qualify himself for their leadership than by knowing his men, by watching over their comforts and little privileges, and by helping them in their troubles? For such an officer men will do anything, and there will be small necessity to call on the powers given by the Army Act to maintain discipline. Example among the officers and the feeling of *esprit de corps* among all ranks will go further towards building up a satisfactory state of discipline in a unit than any amount of punishment. A very fair idea of the discipline of a given corps may be obtained by watching the behaviour of a junior non-commissioned officer marching off a small party of men when no officer is present. If every movement is slack, and the whole performance is a 'go-as-you-please' affair, then it is ten

chances to one that the discipline of that corps is unsatisfactory. If, on the other hand, orders are given and the necessary movements performed in exactly the same manner as they would be on a parade of the battalion, then it may safely be concluded that the discipline is of the best. See *Army; Drill; Military Law*.

Military Law is that form of the statute law of England to which all officers and soldiers are amenable both in peace and war. It is administered by military courts, which have no jurisdiction whatever over any person who is not either an officer or a soldier. There is one exception to this general rule, i.e. in time of war any civilians who may accompany the army become, in virtue of a pass issued to them by the commander-in-chief, subject to military law, either as officers or soldiers, during the period they remain with the army (Army Act, sec. 175-6). Broadly speaking, the following are subject to military law: officers, both regular, militia, and territorial, and regular soldiers at all times; militia and territorial soldiers when embodied or called out for training. An individual becomes subject to military law immediately he enters into military service; but he does not in consequence divest himself of his obligation as a citizen to obey the civil law. During his service he remains amenable to both codes, and can be tried and punished for an offence against ordinary criminal law as if he were not a soldier. English military law is contained in the Army Act, Rules of Procedure, and King's Regulations.

Militia, the old constitutional military force of England, now, after a period of oblivion under the name of the Special Reserve, once more reanimated under its old title. The militia is the lineal descendant, through the Train Bands of the seventeenth century, of the old feudal and general levy of the kingdom, and became generally known under that designation about the time of the Restoration. In 1600 the feudal levy or knight service (see *Army*) was finally abolished, but the general levy, in which was included the Train Bands, was taken in hand and, in the course of the next few years, reorganized on a county basis, while retaining the principle of obligatory service customary with the general levy. As to the method of raising, in course of time, and after various changes had been made, it became much as follows: the county authorities and parishes were informed of the number or quota required from them; each authority was then at liberty to raise its quota in any way considered suitable, i.e. either by ballot or by offering bounties for volunteers. In the event of the number obtained falling short of the requirements, the defaulting authority was fined; substitutes for those balloted were

allowed, and the age limit was between eighteen and fifty.

In the course of years it became the custom to depend less on the ballot than on voluntary enlistment, and since 1852 this has been the principle invariably followed, though the power to ballot was retained for use in emergency.

By the Reserve Forces Act, 1907, power was taken by the king in council to transfer any specified number of battalions of existing militia to the Special Reserve; such transferred battalions henceforward became the third (or subsequent number) battalions of the county regiments, under the general heading of 'Regular and Special Reserve Battalions'.

Milk, the product of the mammary gland found in all female mammals. Cows' milk is most generally used in Europe and North America for human consumption. It has a specific gravity ranging between 1.028 and 1.034 (average 1.032), and is produced by the cow for a period of forty-two weeks, or about three hundred days, after parturition. This period is technically known as a lactation. The quality of milk is dependent entirely upon the condition, quality, and activity of the milk-producing organs, and upon the nature of the blood, from which it is derived by a process involving the building up and breaking down of minute cells contained within the udder. Many variants affect composition, and it has been found that even vitamins may be absent if cows are fed on a diet from which they are either absent or present in insufficient quantity. Quantity is dependent upon mammary development and the pedigree of the animal. The following table is the result of the analysis of a great many samples, and may be accepted as representative of the great bulk of all cow's milk:

Fat ..	3.75 per cent.
Casein .	3.00
Albumen	0.40
Lactose	4.75
Ash ..	0.75
Water ..	87.35

The fat is the most variable constituent, and exists in milk as an emulsion in the form of tiny globules averaging $\frac{1}{2500}$ inch in diameter. It consists of glycerol in combination with certain fatty acids. Lactose is second in order of variability. It is the milk-sugar of commerce, and is technically known as $C_{12}H_{22}O_{11}$. Lactose exists in milk in solution. It is readily attacked by the lactic bacteria, which decompose it with formation of lactic acid (see *Starter*). Casein and ash are practically constant, and the albumen varies only in *colostrum*, the first milk yielded after calving, which may contain as high as 15 per cent, and is unfit for human consumption either raw or as butter or cheese.

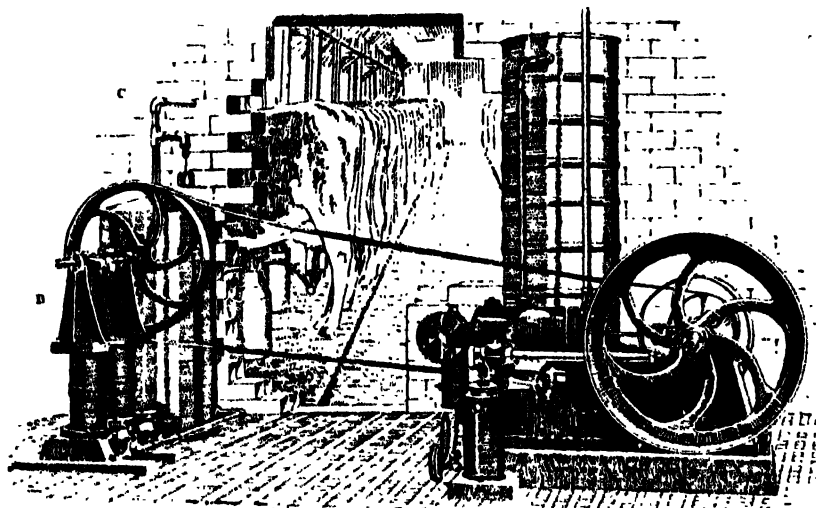
Legal Standards.—In Great Britain whole milk

must contain not less than 8 per cent butter-fat, and not less than 8.5 per cent solids-non-fat. Skim, or separated milk, must contain not less than 8.7 per cent total solids. Grade 'A' milk is produced from tuberculin-tested, disease-free cows, specially milked. The milk is refrigerated and sold in hermetically sealed bottles. It must conform to certain bacteriological standards, and a high price may be demanded for it. Few dairies possess grade 'A' licences in Great Britain. In Great Britain there is no standard of bacterial or sedimentary content, although such laws have been in existence in the United States for some considerable time.

Standard Cyclopædia of Agriculture (Graham Publishing Company).

Milk-fever. At one time this condition was supposed to occur in women after child-birth, when the milk was being secreted in the breasts. It is now recognized that the symptoms of feverishness, when they do arise at such a time, are due to the absorption of infective material in some part of the female genital tract directly following parturition. The condition requires treatment, and should never be looked upon as a natural process.

Milking-machines. Although the idea of a mechanical apparatus to facilitate the milking



Milking Installation

A, Engine; B, Pump; C, Piping led through byre, above cows. By permission of Messrs. J. & R. Wallace.

Cream is that portion of milk which rises to the surface and forms a clearly defined layer when milk is set (allowed to stand). Commercially it is obtained by means of the cream separator (q.v.), which yields cream of any desired consistency by a slight alteration of the regulating screw. In America there are cream standards; in Britain there are none. The specific gravity of cream varies as the percentage of fat it contains: 5 per cent cream = 1.031 approximately; but 40 per cent cream has a specific gravity of less than .94.

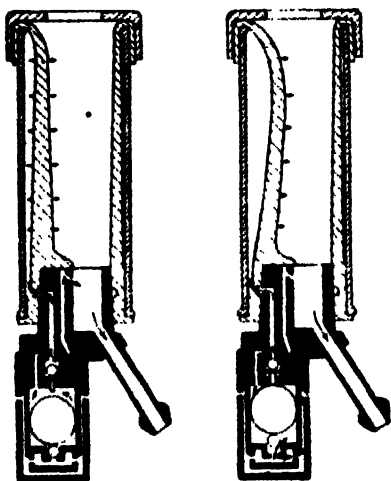
Bacteria is fully dealt with under *Pasteurization and Starter*. **Fermented Milks** are treated under *Yoghurt*. See *Testing of Milk*; *Separated Milk*; *Rennet*; *Lactometer*; *Westphal Balance*; *Koumiss*.—**BIBLIOGRAPHY:** R. H. Leitch, *Butter-making on the Farm*; G. S. Thomson, *British and Colonial Dairying*; H. Droop Richmond, *Dairy Chemistry*; W. A. Stocking, *Manual of Milk Products*; H. A. MacGee, *The Milk Supply*;

of cows was discussed as far back as 1810, it is only within comparatively recent years that an efficient and economical milking-machine has been evolved, chiefly through the genius and untiring effort of two Scotsmen, a dairyman named Robert Kennedy, and an engineer named Lawrence, who subsequently gave their conjoined names to the *Lawrence-Kennedy Milking-machine*. They were followed by Messrs. Wallace of Castle-Douglas (about 1907), who adopted the 'L.-K.' principle, but applied miniature pulsating mechanism to the base of each teat-cup (see diagram on p. 401). At the present day there are many types of machine on the market, some borne by the cow and the others resting upon the ground, the cow carrying the teat-cups only, but the general principles are identical in all cases.

The Lawrence-Kennedy-Wallace idea was to construct a teat-cup capable of imitating closely the action of the suckling calf, and a system has

been evolved whereby the teat is pressed by a rubber pad, a little suction being exerted¹, and the milk is drawn by a vacuum into the milk-pail.

General Principles.—A modern milking installation, as illustrated, consists essentially of a vacuum-producing apparatus, a double-action pump actuated by a 2- to 3-h.p. engine, and connected to a 50-gallon, galvanized-iron, vacuum storage-tank. From the tank a system of piping runs through the byre, carrying taps above each stall. These taps are in turn connected by means of rubber tubing with the milk receptacles, so



Section through Wallace Test-cups and Pulsators

that, when the tap is turned on, the vacuum is transferred to the interior of the receptacle. From each can, or receptacle, lengths of rubber tubing end in the test-cups, of which there may be two sets to a can, so that two cows may be milked simultaneously. Inspection glasses are fitted to the tubing, and on a cessation of the milk-flow from any cause, natural or accidental, this may be observed by the operator, who takes action accordingly. The vacuum in each set of test-cups is regulated by an inlet air-valve, and a gauge is placed in the byre to indicate the degree of vacuum in the tubes as a whole. The efficiency of any machine, everything else being equal, depends almost wholly upon the pulsator and on the skill of the operator.

Machine Milking.—It has been found that most cows take kindly to good milking-machines, and soon become familiar with the rhythmical

beating of the pulsator; but those trained from their first calving, and accustomed to little else but mechanical milking, invariably show better results than animals brought to the machine after, say, a third or fourth calving. On the introduction of the 'L.-K.' machine it was expected that, by drawing the milk directly from the cow's teat to closed, sterilised milk-cans, without allowing it to come in contact with the air or exposing it to other forms of contamination, a very pure milk should be produced, but a bacteriological count has proved a disappointment. Milking by machine does not by any means eliminate the personal element, and all operators must be trained, intelligent, experienced, and scrupulously clean both in person and in habits.

The air of every cow-shed invariably teems with bacteria (micro-organisms) of useful and, more frequently, of dangerous types. Care must therefore be taken in cleaning the machine, and test-cups must not be allowed to fall from the teats during milking (a quite frequent occurrence), permitting dust and organisms from the floor and surroundings to be sucked into the milk-pail.

Good hand-milking and expert machine-milking are about equal as regards efficiency, but the latter is preferable in extreme cases, such as obtained during the European War, when wages were prohibitive and labour was exceedingly scarce. — **BIBLIOGRAPHY:** *Standard Cyclopædia of Agriculture* (Graham Publishing Company); H. A. Macdonald, *The Milk Supply*.

Milkwort, a British plant, *Polygala vulgaris*, ord. Polygalaceæ, abounding in a milky juice, and believed by the ignorant to promote the flow of milk in cows.

MILL, James, born at Logie Pert, Forfarshire, Scotland, 6th April, 1773, died 23rd June, 1836. He was educated at the grammar-school of Montrose and the University of Edinburgh; accompanied Sir John Stuart to London and became tutor in his family; edited the *Literary Journal*, and contributed articles to the *Edinburgh, British, Eclectic, and Monthly Reviews*; began his *History of British India* in 1806, and published it in 1817-8. In consequence of the knowledge which his researches had given him of Indian affairs, he was appointed assistant-examiner of correspondence by the East India Company, and soon afterwards became chief-examiner. He was a frequent contributor to the *Westminster Review*; wrote articles on social and political subjects for the *Encyclopædia Britannica*; and published a treatise on the *Elements of Political Economy* (1821-2), and an *Analysis of the Phenomena of the Human Mind* (1829). In philosophy Mill was a follower of the school of Hobbes and Bentham.

¹ Continuous suction causes a congestion in the udder of the cow, and a consequent decrease in productivity, &c., so that an intermittent suction is now provided by means of the pulsator.

MILL, John Stuart, son of James Mill, was born in London 1806, died at Avignon 1873. He was trained under the immediate influence of his father. His fifteenth year was spent in France; on his return he studied law for a time, and in 1823 he obtained a clerkship in the East India House, remaining in the Company's employment till it was supplanted by the Crown in 1858. In 1823 the *Westminster Review* was begun by the followers of Bentham, and young Mill was one of its earliest contributors, while from 1835 to 1840 he was its principal conductor. In his twenty-first year he edited Bentham's work *On Evidence*. In 1843 appeared the first of his two chief works, *A System of Logic, Ratiocinative and Inductive*, the second being *Principles of Political Economy* (1848). To these he afterwards added his work *On Liberty* (1859), *Thoughts on Parliamentary Reform* (1861), *Utilitarianism* (1862), the *Examination of Sir William Hamilton's Philosophy*, and a *Study of Auguste Comte and Positivism* (1865). In this last year he was returned to Parliament as member for Westminster, where he advocated a measure to admit women to the suffrage, and took part in the Reform Bill debates. At the election of 1868 he was defeated and retired to Avignon. Besides the works already mentioned, he published *Considerations on Representative Government* (1861), *The Subjection of Women* (1869), and *The Irish Land Question* (1870). His *Autobiography* was published in 1873, and the three essays, *Nature*, *The Unity of Religion*, and *Theism*, in 1874. Mill's works on logic and political economy are standard textbooks. In the former he placed the system of inductive logic on a firm basis. As a politician Mill belonged to the school of philosophical radicals, adopting a combination of democratic and conservative ideas. As an economist he was an exponent of the principles of the Utilitarian school, but he was not an unquestioning adherent of this doctrine.—BIOGRAPHY: W. L. Courtney, *Life of J. S. Mill*; C. Douglas, *John Stuart Mill: a Study of his Philosophy*; A. S. Pringle-Pattison, *English Philosophers and Schools of Philosophy*.

MILLAIS (mil'ās), Sir John Everett, Bart., R.A., born at Southampton 1829, died in London 1896. He exhibited his first picture, *Pizarro seizing the Inca of Peru*, in 1846; and received the gold medal for an historical painting, *The Tribe of Benjamin seizing the Daughters of Shiloh*, in 1848. In his earlier days he was a leader of the Pre-Raphaelite school, but on attaining maturity in art he abandoned the peculiarities for which that school was noted. As the result of this new departure Millais painted such pictures as *Ferdinand lured by Ariel*, *Meriana in the Moated Grange*, *The Huguenot Lovers*, *The Black Brunswickers*, and

Ophelia, while its influence was also apparent in his landscapes of *Chill October* and *The Fringe of the Moor*. Among his later works are: *The North-West Passage*, *The Princes in the Tower*, *Effie Deans*, *Cinderella*, and *Mercy—St. Bartholomew's Day, 1572*. In portraiture he holds the foremost rank, and he painted many of the most distinguished men of the day. He was made a baronet in 1885. In Jan., 1890, he was elected P.R.A., but died the following August. Many of his works are well known by engravings.—(Cf. J. E. Reid, *Sir J. E. Millais*).

Millau (ancient *Æmillanum*), a town of Southern France, department of Aveyron, on the Tarn. It is in a coal-producing area, and manufactures gloves and wool. In mediæval times Millau was a fortress town. The fortifications were destroyed by Richelieu (1620).

Millennium (Lat. *mille*, thousand, and *annus*, year), a period of one thousand years. The term is applied to the reign of peace preceding the Last Judgment, and supposed to last one thousand years. The Millenarians believe that at the end of time Christ will return, gather together the just, resuscitate the dead saints, and establish His glorious earthly kingdom. This fervent expectation of and belief in an earthly Messianic kingdom, a sort of interregnum preceding the Last Judgment, is mentioned in the apocalyptic books of *Enoch*, *Baruch*, and second *Esdra*s. Nowhere, however, is the duration fixed at one thousand years. In the New Testament the doctrine of the Millennium is clearly taught in *Rev. xx*, where it is said that Satan would be put in chains, and the martyrs of faith, raised from the dead, would participate in the glorious reign of Christ. Under the influence of Alexandrian philosophy the belief was abandoned for some time, but was again revived during the Reformation and cherished by the Anabaptists. Cromwell's Fifth Monarchy men were all Millenarians, and at present millennial hopes are entertained by several religious sects, and the doctrine has many adherents in this country and in the United States.

Millepede, or Millipede (Lat. *mille*, a thousand; *pes, pedis*, a foot), a name common to animals resembling centipedes, of the phylum Myriapoda, from the number of their feet. The most common is the *Iulus sabulosus*, about 1½ inches long. The young when hatched have only three pairs of legs, the remainder being gradually acquired till the number is complete, which is usually about 120 pairs. See *Myriapoda*.

Miller, Hugh, geologist, was born at Cromarty in 1802, and died 1856. He became a stone-mason, and while working at his trade he studied literature, wrote a great deal, and in particular became an expert geologist. His

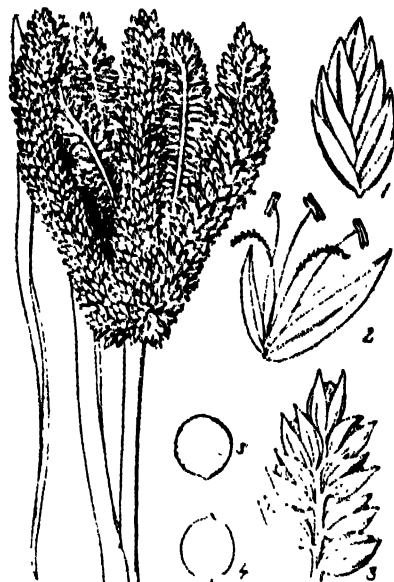
first publication appeared in 1839, under the title of *Poems Written in the Leisure Hours of a Journeyman Mason*, and this was followed in 1835 by the prose volume of *Scenes and Legends of Cromarty*. He was then appointed to a post in a bank at Cromarty, and while employed in this capacity took an active part in the religious controversy that ended in the Disruption. In 1840 he went to Edinburgh as editor of *The Witness* newspaper, after 1843 the chief organ of the Free Church. In this paper he printed the work subsequently published under the title of *The Old Red Sandstone*, which attracted the immediate attention of the scientific world and established his reputation as a geologist. This was followed by *First Impressions of England and its People*; *Footsteps of the Creator*; *My Schools and Schoolmasters*, a charming account of his earliest life; and *The Testimony of the Rocks*, in which he tried to reconcile the Mosaic account of creation with the teachings of geology. His *Schools and Schoolmasters* was supplemented by the *Life and Letters*, published in 1871.—Cf. W. K. Lewis, *Hugh Miller*.

Miller, Joseph, English actor, better known as Joe Miller, was born in 1684, it is supposed in London, and was a favourite low comedian. He died in 1738. The jests which have immortalized his name were collected in 1739 by John Mottley (1692-1750). A lithographic facsimile of the first edition, which is very rare, was published in 1801.

Millerand, Alexandre, President of the French Republic, born 1859. Admitted to the Bar (1881) and elected Deputy for Paris (1885), he became the leader of the Socialist Left, and afterwards an independent Socialist. He was editor successively of *La Voix*, *La Petite République* (until 1890), and *La Lanterne*, in which he was associated with Aristide Briand and René Viviani. He was Minister for Commerce in the Waldeck-Rousseau Cabinet, and became Minister of Public Works in 1909. On 25th Aug., 1914, he returned to the Ministry of War, which he had occupied between 1912 and 1918, and remained there until the resignation of the Viviani Cabinet in 1915. Elected to the Academy of Moral and Political Sciences (1917), he became Administrator of Alsace-Lorraine (1920), followed Clemenceau as Premier, and succeeded Paul Deschanel (died, 29th April, 1922) as President, 8rd Sept., 1920.

Millet, a common name for various species of cereals yielding abundance of small seeds, more particularly *Panicum miliaceum* and *P. miliare*, cultivated in the East Indies, China, Arabia, Syria, Egypt, &c., where it is used as human food. The leaves and panicles are given both green and dried as fodder to cattle. *German millet* (*Setaria germanica*) is cultivated on account

of its seeds, which are used as food for cage-birds. *Italian millet* (*Setaria italica*) is a closely allied species.



Millet (*Eleusine coracana*)

1, Spikelet. 2, Flower. 3, Spikelet in fruit. 4, Seed with arillus. 5, Seed without arillus.

Millet (mil-la), Jean François, French artist, born at Gruchy, near Cherbourg, 1814, died 1875. He worked with his peasant father in the fields; studied drawing at the academy of Cherbourg; from thence passed with an allowance from his town to the atelier of Delacroix in Paris, and exhibited at the Salon in 1840. As a student and until the death of his first wife in 1844 he was frequently in the greatest poverty, and his life subsequently was by no means free from difficulty. In 1840 he left Paris and settled among the peasants of Barbizon, on the edge of Fontainebleau Forest, and devoted himself to transferring their simple everyday life to his canvases, which he did with great truth and charm. Of his paintings may be mentioned: *The Sheep-shearers*, *The Gleaners*, *The Sower*, *The Shepherdess with her Flock*, and *The Angelus*. The last was sold by auction in Paris in 1889 for about £23,000.—BIBLIOGRAPHY: J. C. Ady, *Jean François Millet: his Life and Letters*; R. Muther, *Jean François Millet*; Edgcumb Staley, *J. F. Millet*.

Milling-machine, an important machine used in the fulling department of woollen-mills. After the cloth has been well washed, scoured, and hydro-extracted, it is taken to the milling-machine, where it is threaded through one of

the holes of a knock-off board, then through a kind of spout and trough, down the curved bed of the back of the machine, and again led up to the knock-off board. This cycle is repeated three or four times, but each time the cloth is passed through a different hole in the knock-off board. The latter is attached to the control pulleys and adapted, when lifted, to stop the machine if the lengths of cloth get entangled. Pressure is applied to the cloth in the spout, and occasionally the required amount of soap is fed automatically. All parts are enclosed, and a certain degree of heat is obtained during the operation. The combined action of the various parts causes the fibres of the cloth to become more or less interlocked with each other, the ultimate result being a decreased length and width, and a consequent increase in solidity and thickness.

The term is also used for other machines. The important engineering tool of this name is described in the article on *Machine Tools*. Flour milling is dealt with under *Flour*.

Millom, a town of Cumberland, England, 9 miles north-west of Barrow, with iron-mines and blast-furnaces. Pop. 8709.

Milman, Henry Hart, born 1791, died 1868. In 1812 he received the Newdigate prize for an English poem on the *Apollo Beholdere*; published *Fazio*, a tragedy, which was performed at Covent Garden Theatre; and in 1815 was appointed vicar of St. Mary's, Reading. He delivered the Bampton lectures in 1827; became professor of poetry at Oxford 1821-31; appointed rector of St. Margaret's, Westminster, in 1835, and dean of St. Paul's in 1840. His principal works are: *Samor*, a legendary poem (1818); *The Fall of Jerusalem* (1820); *The Martyr of Antioch* (1821); *History of the Jews* (1829); *History of Christianity to the Abolition of Paganism* (1840); and *History of Latin Christianity* (1855).

Milner, Alfred, Viscount, was born in 1854; he was educated at King's College, London, and Balliol College, Oxford, was called to the Bar in 1881, and for several years was actively engaged in journalism. In 1889 he went out to Egypt as Under-Secretary of Finance, and continued in this post for three years with marked success. Returning to England in 1892, for the next five years he was chairman of the Board of Inland Revenue, and in 1897 he was appointed Governor of Cape Colony and High Commissioner of South Africa. Sir Alfred, who had been created K.C.B. in 1893, undertook the duties of this office at a most critical period, arriving as he did while the Jameson raid was still fresh in the minds of the Dutch population. He played a prominent part in the complicated negotiations with the Transvaal, which were followed by the outbreak in Oct., 1899, of the South African War. After the annexation of the

Boer territories he was appointed Governor of the Transvaal and Orange River Colonies in 1901, retaining at the same time the post of High Commissioner, but resigning that of Governor of Cape Colony. In May, 1901, he paid a short visit to England, and was created a baron, returning to South Africa the same year. In 1902 he was raised to a viscounty. He resigned his offices in 1905 and returned home, being succeeded in South Africa by the Earl of Selborne. In 1910 he became a member of the War Cabinet, and was appointed Secretary for War in 1918. From 1919 to 1921 he was Colonial Secretary. He died 13th May, 1925.

Miltiades (dēz), an Athenian general of the fifth century B.C. When Greece was invaded by the Persians, he was elected one of the ten generals, and drew up the army on the field of Marathon, where, 490 B.C., he gained a memorable victory. Next year he persuaded the Greeks to entrust him with a fleet of seventy vessels, in order to follow up his success. With this, to gratify a private revenge, he attacked the Island of Paros, but was repulsed, and dangerously wounded. On his return to Athens he was impeached, and condemned to pay a fine of fifty talents. Being unable to pay, he was thrown into prison, where he soon after died of his wound.

Milton, John, English poet, the son of John Milton, scrivener, London, was born in the metropolis 9th Dec., 1608, died there 8th Nov., 1674. His father had him carefully educated, and at the age of seventeen he entered Christ's College, Cambridge, where he resided for seven years, took his B.A. and M.A. degrees, and excelled in Latin verse and English composition. It had been intended by his parents that he should enter the Church, but their puritanical beliefs and his own scruples regarding the oaths decided otherwise. During this period were written: *On the Death of a Fair Infant* (1625-6), *On the Morning of Christ's Nativity* (1629), *On Shakespeare* (1630), *On Arriving at the Age of Twenty-three* (1631), and the *Epitaph on the Marchioness of Winchester*. Leaving the university, he went to reside with his father, who had retired to Horton, in Buckinghamshire, and here he remained for the following six years. In this leisured retreat he studied classical literature, philosophy, mathematics, and music. To this period belong his Latin hexameters *Ad patrem*; the fragment called *Arcades*; *L'Allegro* and *Il Penseroso*; the beautiful monody of *Lycidas*, occasioned by the death of his college friend Edward King; and the pastoral masque of *Comus*, played before the Earl of Bridgewater at Ludlow Castle in 1634. In 1637, on the death of his mother, he made a Continental journey, in which he visited Paris, where he was intro-

duced to Grotius; Florence, where he met Galileo; Rome, and Naples. After remaining abroad for fifteen months he returned to England. His Italian sonnets and some other pieces were written during this journey. The home at Horton having been broken up, Milton settled in the metropolis, and undertook the education of his two nephews, the sons of his sister, Mrs. Phillips, and to these, betimes, were added the sons of a few personal friends, who boarded or received daily lessons at his house in Aldergate Street. While settled here his *Paradise Lost* was partially sketched out, but the immediate fruits of his pen were (1641-2) vigorous polemical treatises entitled *Of Reformation touching Church Discipline in England, Of Prelatical Episcopacy, Animadversions against Smectynnuus, and The Reason of Church Government*. In the summer of 1643 Milton married Mary Powell, the daughter of a Royalist family. Divided from her kinsfolk by politics, he was also dissimilar to his wife in age—she being little more than seventeen, while he was thirty-five. Moreover, she found his habits austere and his house dull, with the result that she returned to her father about a month after marriage. Milton quickly made his private trouble a plea for public protest against the marriage laws in his pamphlets on *The Doctrine of Divorce, The Judgment of Martin Bucer, Tetrachordon, and Colasterion*. In the end, however, his wife returned in 1645, bore him three daughters, and continued to live with him until her death in 1658. Besides his pamphleteering, he was at this time occupied in publishing the first edition of his *Minor Poems* in Latin and English (1645), with no apparent recognition of his claims as a poet. In connection with his divorce pamphlets he was prosecuted by the Stationer's Company for having published them without licence or registration. His answer to this was the famous *Areopagitica*, a speech for the liberty of unlicensed printing, which he addressed to the Parliament of England. When in 1649 Charles I was executed and a republic established, Milton avowed his adherence to it in his pamphlet *Tenure of Kings and Magistrates*, and was appointed Foreign (Latin) Secretary to the Commonwealth. While occupying this position he wrote in 1649 *Eikonoklastes* (Image-breaker) in answer to the *Eikon Basilike* (q.v.), and his *Pro Populo Anglicano Defensio* (Defence of the People of England), the latter in answer to Salmasius of Leyden, who had vindicated the memory of the late king. In this literary task his eyesight suffered so much that in 1652 he became totally blind. Nevertheless he continued Latin Secretary with the assistance of Andrew Marvell, and dictated some of Cromwell's most important dispatches. Upon the

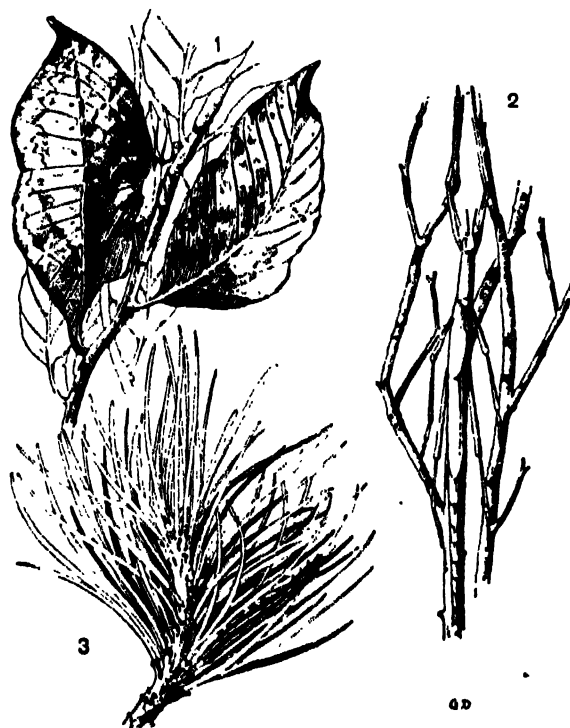
death of the latter, and in the confusion which resulted, Milton in 1659 wrote his *Ready and Easy Way to Establish a Free Commonwealth*. But when Charles II was restored a few months later, the blind politician remained in hiding, his books were burned by the common hangman, and he himself narrowly escaped the scaffold. He had married a second wife in 1656, who fifteen months after had died in child-birth. In 1663 he married a third time, and began the writing of *Paradise Lost*. This was published in 1667, the publisher agreeing to pay the author £5 down and a further £5 after the sale of each edition of 1000 copies. The published price was three shillings, and the poem was at first in ten books. In two years a second edition, now arranged into twelve books, was printed, and Milton's position as the greatest poet of his time was established. In 1670 there appeared his *History of Great Britain to the Norman Conquest*, and in the following year the continued vigour of his poetic faculty was shown in *Paradise Regained* and *Samson Agonistes*. In 1674, the last year of his life, he printed his *Epistolarum Familiarium et Prolusione Oratoriarum*. His death took place at his house in Bunhill, and he was buried in the church of St. Giles, Cripplegate. Professor David Masson's *Life* of the poet is the most complete history we have of the man in relation to his times.—BIBLIOGRAPHY: D. Masson, *Life of John Milton*; M. Pattison, *Milton* (English Men of Letters Series); R. Garnett, *Milton* (Great Writers Series); R. Bridges, *Milton's Prosody*.

Millwaukee, chief city and port of Wisconsin, United States, on the west shore of Lake Michigan; served by the Chicago & North-Western Railway, &c. Part of the town occupies a high bluff overlooking the lake, and among the chief buildings of the city are the court-house, post office, two cathedrals, free library, and museum. The main element in the prosperity of Milwaukee is its vast trade in grain, and extensive industrial establishments connected with iron, flour, leather, lager beer, agricultural implements, &c. It has rapidly advanced from a population in 1840 of 1700 to one in 1920 of 457,147.

Mime, a kind of dramatic performances common among the ancient Greeks and Romans. Mimes appear to have originated among the Greek colonists of Southern Italy, and consisted first of extemporary representations at festivals of ludicrous incidents of common life, but afterwards developed into dialogues intended for reading, not acting. The inventor of the original mime was Sophron, whose work influenced that of Plato. The literary mime is preserved in the works of Herodas (q.v.).

Mimicry, a more or less close resemblance

between two non-related animal species. One of these, the 'model', exhibits warning coloration, marking the presence of characters helping to protect it from the attacks of carnivorous forms. The 'mimic' superficially resembles the model, but does not possess its special protective characters. Bees, for example, are mimicked by clear-wing moths and drone-flies.



Mimicry and Protective Resemblance

1. Indian Leaf Butterfly (*Kallima inachis*) with closed wings.
2. Tropical Stick Insect (*Phasmidae*). 3. Caterpillar of Pine Beauty Moth (*Panolis pini-perda*).

A well-known North American butterfly, the Black-veined Brown (*Anosia crippus*), is unconsciously imitated by an edible species (*Limenitis misippus*). One of the most remarkable instances is that of a South African Swallow-tail Butterfly (*Papilio merope*), in which the male is protectively coloured, while there are three kinds of female, that mimic three distinct species of butterflies found in the same area, and known to be unpalatable to insectivorous animals. Other cases have been described among birds, reptiles, and spiders; while instances of plant mimicry have also been noticed.

Mimnermus, an ancient Greek poet and musician, who was probably born at Smyrna, and flourished from about 630 to 386 B.C. His

poems chiefly consisted of love elegies, and only a few fragments have come down to us. They form an epoch in the history of elegiac poetry, having first diverted it from warlike and convivial to plaintive, amatory, and mournful strains.

Mimosa, a genus of leguminous plants, type of the subdivision Mimosaceæ. The stigma is irritable, the two lobes folding together quickly when touched, a condition which favours cross-pollination. See *Sensitive Plants*.

Mimulus, a genus of plants, nat. ord. Scrophulariaceæ. There are about forty species, natives of extratropical and mountainous regions of Asia, Africa, Australia, and America. They have often handsome red, yellow, or violet flowers. *M. luteus* has become naturalized in Britain on the banks of streams, &c. *M. moschatius* is the musk plant of gardens. Others are favourite flowers.

Minaret, a slender lofty turret rising by different stages or stories, surrounded by one or more projecting balconies, commonly attached to mosques in Mahomedan countries, and frequently of very graceful design. Minarets are used by the muezzin for summoning from the balconies the people to prayers at stated times of the day; so that they answer the purpose of bells in Christian churches. The minarets of Egypt, Spain, Syria, India, and Persia, built between the thirteenth and sixteenth centuries, are among the most graceful works of Eastern architecture. See *Muezzin*.

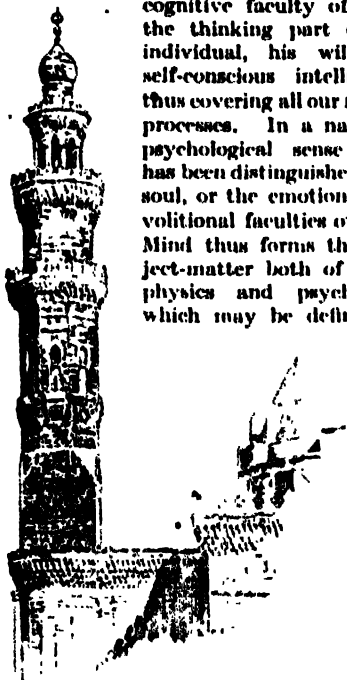
Minas, a southern inland department of Uruguay, devoted to grain and stock-raising. Area, 4819 sq. miles; pop. (1920), 75,818. Minas, 80 miles N.N.E. of Montevideo by rail, is the capital. Pop. about 9000.

Minas Geraes, an inland state of Brazil, an afforested plateau (altitude 1500-3000 feet), watered by the São Francisco and Parahyba River systems. Bello Horizonte supplanted Ouro Preto as capital in 1894-5. There is a railway system of 4046 miles. Foreign 'colonies', maintained by the Union, are located at João Pinheiro (1910) and Inconfidentes (1910). Much coffee is produced, with some yerba maté; manganese ore is worked. Area, 221,894 sq. miles; pop. (1920), 6,788,837.

Mind, a term used in philosophy to designate that form of reality which is the opposite of matter; i.e. the principle of activity and order in the universe. Observation and experience revealed to philosophers two fundamentally

distinct and contradictory principles of reality in the world. On the one hand there was matter, occupying space and possessed of inertia and passivity. On the other there was the principle of movement, harmony, and order, of consciousness and design. The question consequently arose whether these two forms of being were quite distinct from each other, or merely two phases of one sub-stratum, and to this question philosophers have endeavoured to find an answer. In psychology the term *mind* is applied to the

cognitive faculty of man, the thinking part of the individual, his will and self-conscious intelligence, thus covering all our mental processes. In a narrower psychological sense mind has been distinguished from soul, or the emotional and volitional faculties of man. Mind thus forms the subject-matter both of metaphysics and psychology, which may be defined as



Minaret of the Mosque of Sultan Hassan, Cairo

the philosophy of the mind. This science inquires into the operations of the human mind, and gives an account of the phenomena of developed consciousness as it manifests itself in man. Psychology treats of mental life, intellectual or affective, and of consciousness in all its aspects. It analyzes the powers of perception, memory, retention, volition, and freedom of will, and also the relation existing between the human mind and the human body (see *Psychology*). In metaphysics the problem of mind has occupied philosophers of all ages, from Anaxagoras to Bergson. Struck by the apparent contradiction of activity and passivity in the world, and, above all, by the intellectual life pervading the universe, of consciousness, design, and order, philosophers tried to define and explain the efficient cause of movement,

order, and harmony. They also formulated answers to the question connected with the inter-relation of mind and non-mind. These answers have ranged from the assumption that non-mind, or matter, is a manifestation or mode of mind, to the opposite view which holds that mind itself is only a product of matter. Three distinct theories have been formulated in answer to the question concerning the relation of mind and matter.

Idealism (or spiritualism) maintains that mind is the only reality of being, everything else is derived from mind, or is only appearance. The real essence of things is an immaterial force, self-conscious and endowed with the sense of personality. Matter, physical and unconscious, cannot think, and, as a French poet expressed it:

Je pense que la pensée, éclatante lumière,
Ne peut pas sortir du sein de l'épaisse matière.

The essence of being therefore, working behind appearances, is of a spiritual, immaterial nature, i.e. mind. The first philosopher who clearly made a distinction between the material and the spiritual, between matter and mind, was Anaxagoras (q.v.), who introduced the idea of *nous*, intelligence, or the organizing and governing principle. He assumed the existence of an intelligent cause of motion, endowed with activity, force, and consciousness, and producing movement and life in the universe. Socrates praised this doctrine of the *nous*, and Aristotle said of Anaxagoras that "he was like a sober man among drunken people who speak at random". *Materialism* (q.v.) denies the existence of mind, and looks upon all mental phenomena as the result of matter. *Dualism* again admits the existence of both matter and mind. Mind is unextended, and active, whilst matter is extended and soulless. "We can neither conceive mind", says Sir W. Hamilton, "without consciousness, nor body without extension". The two great philosophers of antiquity, Plato and Aristotle, are dualists, but the founder of Dualism in modern philosophy is Descartes. The dualists consider mind and matter as two separate substances, existing side by side and independently of each other. Dualism, or the existence of both mind and matter, is also at the basis of the purer religious systems, especially of the three most important forms of monotheism, Christianity, Judaism, and Mahomedanism. (For *Human Mind*, see *Psychology*).—BIBLIOGRAPHY: P. Janet and G. Séailles, *A History of the Problems of Philosophy*; A. S. Rappoport, *A Primer of Philosophy*.

Minden, a city of Westphalia, Germany, on the Weser. In the Middle Ages the town was a strongly fortified commercial centre and a member of the Hanseatic League. The Bishop of Minden ruled the diocese as a principality, but

his temporal power was transferred to Brandenburg in 1648, and with that electorate contributed to the rise of Prussia. In 1759 the French were defeated at Minden by an Anglo-Hanoverian army (Seven Years' War). Pop. 20,000.

Mine, in a military or naval sense, means an arrangement by which a certain road, locality, or area of sea is prepared with explosives in order to deny its use to an enemy. On land such an arrangement is known as a 'land-mine' or 'fougasse' (q.v.), while at sea the word is used without prefix. Land-mines are of two main sorts: the one designed to work automatically on being subjected to the weight of troops or vehicles crossing it (contact mine), the other intended to be exploded electrically from an observation-point. In the European War, during the period of trench warfare, mines were largely used as an aid to assault, i.e. tunnels were driven under the enemy lines, and a mine laid and exploded at the hour fixed for the commencement of the operations.

Mines used at sea are, in these days, almost invariably of the contact variety, i.e. they are huge metal containers of a suitable shape filled with a great quantity of high explosive, and fitted with strikers (or horns) similar to the buffers on a railway carriage. The horns, when struck heavily, as by a moving ship, cause the mine to explode. Such mines are usually grouped together in mine-fields of greater or less extent, and are anchored by a contrivance which keeps the top of the mine, bearing the strikers, at a suitable distance below the surface of the water to intercept the particular class of ship it is meant to guard against. The use of both land- and sea-mines is permitted by the laws of war, but the intentional laying of floating or loose mines is not allowed.

Mine Inspection was first instituted in 1850 under the provisions of a Bill for the Better Regulation of Coal-mining in the United Kingdom. Three inspectors were at that time appointed, but under the Amended Acts of 1860 and 1872 the number was increased to twelve inspectors with twenty-five assistants. In the Coal Mines Regulation Act, 1887, previous Acts were amended and consolidated, while between that date and 1911 minor changes were introduced by various Acts. These Acts are in the main repealed by the Coal Mines Act 1911. Under the last-mentioned Act provision is made for the better inspection of locked safety-lamps, the use of explosives in blasting, the ventilating of shafts, roads, and workings, the fencing of shafts and entrances, provision of shafts, outlets, and refuge holes, support of roofs and sides, prevention of coal dust, provision of baths, and the upkeep of machinery. In the case of an accident which has caused injury of person or

loss of life, notice must be sent to the mine inspector for the district, so that he may report the same to the home secretary, who shall provide for a formal investigation should he think fit. It is the duty of the inspector to see that boys under fourteen years and women and girls of any age do not work below ground in the mine, and that the conditions and hours of their employment above ground are strictly observed. It is also enacted that every mine shall be under the supervision of a certificated manager, and must be visited and inspected daily. Wages are to be paid weekly if the majority of employees so desire, and they must not be paid in a public-house or other house of entertainment. The mine-inspector is permitted to inspect the books, plans, and documents which the law prescribes shall be kept by the mine-owner, and he is also entitled to receive all special rules and annual returns. The Mining Industry Act, 1920, established a department of the Board of Trade (to be known as the Mines Department) for, *inter alia*, securing the safety and welfare of the workers, and provides for pit committees whose functions are to discuss and make recommendations with respect to, *inter alia*, the safety, health, and welfare of the workers, and the reports of inspections made on their behalf.

Mineralogy, the scientific study and description of minerals, was originally bound up with the study of rocks, and many bodies of composite mineral constitution, now treated as rocks, found their place in mineral classification. It is well, then, to limit the science at the outset by defining a *mineral* as a natural body of inorganic origin, which has a definite chemical composition, and which, under favourable conditions, can assume a characteristic crystalline form. This definition excludes a number of substances popularly classed as minerals, such as mineral oil, obsidian, and common potter's clay; these must go over to the rocks which are aggregates of mineral particles but which cannot assume a crystalline form. Their constituents may separate out, or be already separated out, as distinct minerals; but a rock-mass is of composite structure, and commonly contains examples of more than one mineral species. Coal is excluded from minerals as a mixture of hydrocarbons, and it is, moreover, of organic origin.

The determination of the chemical constitution of the more complex minerals is beset with difficulties, owing to possibilities of change and decay during their long life-history, and of inclusion of other substances during their original growth. Here synthesis is of great value, and a number of minerals have been artificially reproduced from pure chemicals under suitable conditions. The element of geological time is, however, lacking in our laboratory

experiments, and we are commonly ignorant of the environment of minerals at the epoch of their birth, including the presence of catalyzers that have now disappeared, but which promoted deposition and co-ordination of the particles in the arrangement that we style crystalline. Chemical composition, moreover, does not always define a mineral species, since this may be the same in two or more species which differ in physical characters and crystal-form. Measurement of crystals by the goniometer, and the consequent assignment of them to this or that crystallographic system and class (see *Crystallography*), afford the surest means of determining mineral species.

Short of these delicate investigations, material for which may rarely be obtainable, a consensus of evidence drawn from a number of characters will commonly serve to identify a mineral specimen. The specific gravity and hardness of crystalline examples are particularly helpful. Among metallic ores, colour is important, though it is of little value among ordinary translucent or transparent minerals, where it may be due to trivial stainings, or even to a response to external radiations. While, for instance, pyrite, cubic iron disulphide, is always brass-yellow, and nickeline, nickel arsenide, is always coppery red, both ruby and sapphire are differently coloured varieties of the mineral corundum, crystallized aluminium oxide, while fluorspar, calcium fluoride in a mineral condition, is noted for a range of colour from purple, green, and yellow, down to rusty red. In such cases colourless varieties may be rare; but their occurrence indicates a character of the pure mineral.

Simple chemical tests, especially when aided by an expert use of the mouth blowpipe, are of immense service in identifying mineral species, provided that other characters than those due to chemical response are at the same time taken into consideration. During the last hundred years the determination of the optical characters of minerals has been immensely extended, and even minute crystals may now be identified in thin sections of rocks under the polarizing microscope. Early studies on polarized light were made by using the mineral calcite, and the development of theoretical optics has depended largely on the observed behaviour of light-rays in traversing minerals and on emergence from them. The application of these observations to determinative mineralogy has received great impetus from the requirements of modern petrology. The use of 'angles of extinction' in the feldspars, and in the pyroxene-amphibole group, and of the optic axial angle in the micas, may be cited as examples.

The study of mineralogy from early times had two aspects, economic and æsthetic. Sometimes

this led to the destruction of fine specimens on account of the value of their constituents; and even the æsthetic use, as illustrated in the cutting of gems, and in the strewing of cinnabar, the vermilion ore of mercury, on the floor of a Roman amphitheatre, may bring regret to the mineralogist, who is a student of natural things. Yet the search for minerals of economic importance has enriched the science by the opening up of veins that are veritable treasure-houses of new species, or of known species in their habit as they lived, exquisitely preserved from the destructive influences that attack them on the surface of the earth. It is no wonder that interest in mineralogy mainly developed in regions of mining activity, such as southern Saxony and Cornwall, and in later days Colorado and South Africa.

The founders of the science were men who collected and correlated facts from the whole range of natural history. Even J. B. Romé de l'Isle, the crystal-measurer, owed much to his sojourn as a prisoner of war amid the natural attractions of the Indies. The elder Pliny, Linné, and Buffon were, in varied measure, mineralogists. The wealthy travellers of the close of the eighteenth century, men of literary rather than scientific culture, often formed collections of minerals, as a record of things strange and beautiful, for the adornment of their spacious homes. The specialized mineralogists who arose in the same epoch looked on such men as their patrons, and gradually great national collections were built up, such as those of London, Petrograd, and Vienna, where minerals were classified on scientific lines. The importance and the charm of mineralogy have been to some extent overshadowed by the wide growth of geology, and it must be admitted that university curricula do not always recognize the subject as fundamental for the geologist, and as the natural history branch of chemistry. **BIBLIOGRAPHY:** J. D. Dana, *Textbook of Mineralogy*; H. A. Miers, *Mineralogy*; T. Crook, *Economic Mineralogy*; G. J. Brush and S. L. Penfield, *Manual of Determinative Mineralogy*.

Mineral Tallow, or **Hatchettite**, a mineral hydrocarbon found in the coal measures of South Wales and Belgium. It is a yellow, odourless, waxy substance, transparent when found, but turning opaque on exposure to the air.

Mineral Waters is the term commonly applied to the spring-waters that contain an unusual quantity of such substances as sodium, magnesium, iron, carbonic acid, and sulphur; but it cannot be used in any absolute fashion. The most popular European springs are those of Aix-la-Chapelle, Wiesbaden, Baden-Baden, Carlsbad, Ahrweiler (Apollinaris), Friedrichshall, Buda-Pest (Hunyadi-Janos), Vichy, and Bath. The waters are usually drunk at an early hour

before breakfast, and the curative effects are greatly aided by early rising, moderate exercise, mental relaxation, and complete freedom from all kinds of excess. It has not been found practical or useful to classify mineral waters under their chemical elements, but the attempt has been made, as where the springs are described as—salt, earthy, sulphur, iron, alkaline, and alkaline-saline. Besides the substances which these terms indicate, the waters are frequently impregnated with carbonic acid gas, which is found to aid digestion while giving a pleasant stimulus to the general system.

Mineral Wool (also known as slag-wool or silicate cotton), a substance which is produced from the vitreous liquid slag of a blast-furnace drawn out into fine fibres under pressure of steam. The slag, when in a molten condition running from the furnace, is driven by the steam through a crescent-shaped aperture, and suddenly cools into long fibrous filaments. The thin, glassy, thread-like substance thus produced is useful as a non-conductor of heat, and it has, therefore, been largely employed as a covering for boilers and steam-pipes, to prevent loss of heat by radiation, and also as a covering for water-pipes, &c., to prevent freezing.

Minerva, a daughter of Jupiter, and one of the great divinities of the ancient Romans. She was looked upon as the patroness of all arts and trades, and her annual festival, called Quinquatrus, lasted from the 19th to the 23rd of March inclusive. This goddess was believed to protect warriors in battle, and to her was ascribed the invention of numbers, and of musical instruments, especially wind instruments. At Rome a temple was built for Minerva by Tarquin on the Capitol, where she was worshipped along with Jupiter and Juno; and there was also a temple on the Aventine dedicated to herself alone. This deity is supposed to be of Etruscan origin, and her character has much in common with the Greek goddess Athena (q.v.).—(Cf. A. Fairbanks, *The Mythology of Greece and Rome*.)

Mingre'lia, a district of the Caucasus, in Georgia, part of the province of Kutais; area, 2,400 sq. miles. It was annexed by Russia in 1867. The Mingrelians are closely related to the Georgians. The country is mountainous, but cereals, wine, and oil are raised; gold and manganese are found.

Miniature, a term derived from the Lat. *minium* (red lead), used to describe the illustrations in illuminated manuscripts (see *Illumination*), and thence applied to any paintings on a small scale, especially portraits. In its latter sense, the miniature has found its chief home in England, and reflects the same passion to express individual personality which produced

the Renaissance medal. Oil paint and enamel, on copper, have been used for miniatures; but the most usual medium has been transparent or opaque water-colour on vellum or thin card, or (since the end of the seventeenth century) on ivory. The earliest miniatures date from the sixteenth century, and in delicacy of execution, and decorative use of colour and gold, show their kinship to the illuminated manuscript. They include examples ascribed on good grounds to Holbein, and the work of Nicholas Hilliard (1547–1619), miniaturist to Queen Elizabeth. Similar in type are several delicate and refined portraits, approximating to the miniature, produced in France by members of the Clouet group. Isaac and Peter Oliver, employed by James I and Charles I, mark the tendency of the miniature to become an easel portrait on a small scale, in a greater use of modelling, and occasional use of realistic backgrounds. During the Commonwealth, John Hoskins occupies an important place; but he was eclipsed by his nephew Samuel Cooper, whose unfinished portrait of Oliver Cromwell (in the collection of the Duke of Buccleuch) shows the breadth of handling and strong characterization which mark all his work. In France, meanwhile, there flourished a number of skilful miniature painters in enamel, including Leonard Limousin (1505–77); Jean Petitot (1607–91), a Swiss who worked in France and England; and the members of the Toutin family. Their work, however, is a technical *tour de force* in dealing with refractory material, rather than an artistic achievement. Prominent during the earlier eighteenth century in England were Lawrence Cross, Gervase Spencer, and Bernard Lens. A later and more famous group includes Richard Cosway (1742–1821), whose brilliant and facile, though empty and mannered, work marks some return to the decorative tradition, and won him great reputation; Cosway's pupils Andrew and Nathaniel Plimer; his rival George Engleheart (1750–1820), dryer and more severe, but equally mannered; John Smart (1741–1811), in power of characterization the best miniaturist of his time; and Henry Bone (1755–1839), an accomplished painter of enamel portraits. On the Continent, contemporary miniaturists include Pierre Adolf Hall, a Swede working in Paris; Dumont; and Fûger, known as the Cosway of Vienna. Fragonard produced a few miniatures eagerly sought for by collectors. Later, J. B. Isabey (1767–1855) painted during the Imperial and Restoration epochs, a series of skilful miniatures, whose importance is personal and historical rather than artistic. With the eighteenth century, the art of the miniature virtually died. Spasmodic attempts at its revival have been made; but the development of photography has prevented

their success. — BIBLIOGRAPHY: G. C. Williamson, *History of Portrait Miniatures*; J. J. Foster, *British Miniature Painters*.

Minicoy, an isolated atoll of the Indian Ocean, between the Andaman and Laccadive groups, and included in the latter.

Minim Friars, or **Minims** (from Lat. *minus*, least), an order of reformed Franciscans, founded by St. Francis of Paola in Calabria in 1473. The order was confirmed by the Pope in 1474. The dress of the Minim Friars is black, and, like that of the Franciscans, they were provided with a scourge. They belong to the mendicant orders, and possessed, in the eighteenth century, 450 convents in thirty provinces.

Minimum Wage, in economics, a term applied to the lowest level of earnings and wages fixed by law; wages which enable the worker and his family to live in social decency. The movement to secure a minimum wage, which arose in the nineteenth century, when the idea of State interference gradually began to supersede that of *laissez-faire*, is due to the efforts of social reformers and labourers to force less highly paid trades to pay their workers a living wage. The first minimum wage legislation was enacted in New Zealand (1894), and a similar legislation was enacted in New South Wales in 1901, and in Australia in 1904. In the United Kingdom the first Act establishing trade-boards, with power to fix minimum rates of wages, was enacted in 1909 (Trade Boards Act). This Act at first applied to four trades, but in 1913 wage-boards were established in four additional trades. The principle was extended to agricultural workers in 1917 (Corn Production Act), but the Act was repealed in 1921.

Mining, a term which embraces all the processes necessary for the extraction of minerals from the crust of the earth. The art of mining is very ancient, and is referred to in the *Book of Job*. There is a considerable amount of literature on the subject and a systematic account of mining operations was published in Latin as early as 1556 by Agricola. The two principal methods of obtaining minerals are by open workings, known in this country as 'quarries', and underground workings, known as mines. The principal substances obtained as a result of the labour of the miners are coal, the minerals from which the metals are obtained, such as iron ore, lead ore, &c., building materials, salt, gems, &c. The method adopted in the mining of any particular mineral will depend largely on the mode of occurrence of the material in the earth's crust, the most important modes being the following: (1) Beds or seams, which are individual members of groups of stratified rocks, and have been formed as a layer at the bottom of a sea, lake, river, &c.

(2) Veins or lodes which have been formed subsequently to the rocks which enclose them, probably by the filling in of fissures formed in the original rock. (3) Masses which comprise mineral deposits which cannot be classified as beds or veins.

Before a mine can actually produce mineral, much preliminary work is necessary. The actual discovery of the deposit may have been accidental or the result of prospecting work; after discovery, and before mining proper is attempted, a large amount of preliminary or exploratory work is necessary to ascertain the probable extent of the deposit and its thickness, in order to calculate the amount of mineral available. During this work samples are obtained from which to determine the value of the deposit, and to ascertain variations in quality existing at different parts, and at the same time information is collected on the nature of the deposit as regards its effect on the mode and cost of working. This exploratory work may be carried out by boring operations supplemented by underground exploration. The actual excavation of the mineral may be made by hand or by machinery, the motive power in the latter case being steam, water, compressed air, or electricity. Blasting by means of explosives is very commonly used as a method of excavation in hard deposits, and is also largely used in the case of softer minerals such as coal. In modern mining, a large amount of the heavy work, at one time done by hand labour, is performed by means of machines, such for example as rock drills used for boring holes for blasting purposes, &c., and cutting machines used for cutting out coal, &c. Excavations made in hard rock are sometimes safe without support, but, generally speaking, the miner has to arrange support for the roofs and sides of his shafts, levels, and working places, and for this purpose timber is most largely used, although masonry and steel are also employed.

In underground workings, the deposits are reached by shafts which are vertical or steeply inclined passages, by inclines which are sloping passages or tunnels, or by means of adits which are nearly horizontal passages running into the deposit from the side of a mountain, &c. The decision as to which of the methods is used depends largely on the contour of the country and the depth of the deposit. Several methods are used for the actual working or removal of the mineral, of which the two following are the most important. (1) Chambers and permanent pillar method, in which the deposit is not completely removed, part of it being left as supporting pillars. This method is adopted with minerals of low intrinsic value, when the pillars left behind may be of less value than the cost of putting in the artificial supports, which would

be necessary were the whole deposit removed. (2) Subsidence of roof or caving method, in which the removal of the mineral is carried out as completely as possible with subsidence of the roof. This method is chiefly used in the mining

aid of long working faces on the seam; these faces may be half a mile long or even more. The roof near the working place is timbered, and, as the face is gradually worked away, the props behind are removed, and the roof is allowed

to fall. The roadways up to the working face are protected by timbering. In some cases waste material is filled in to take the place of the mineral removed.

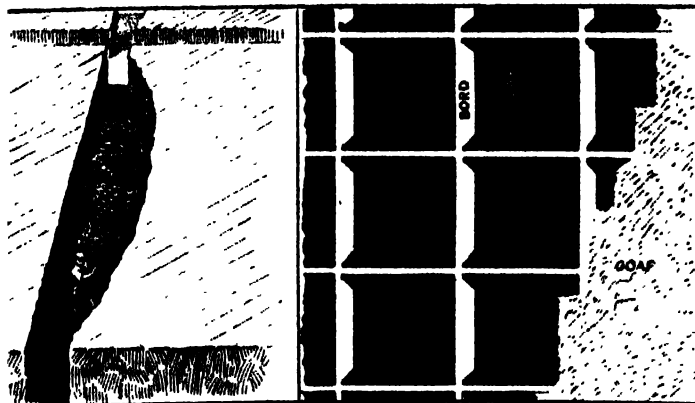
After the actual breaking down and excavation of the mineral, it is conveyed in suitable mine cars to the hoisting shaft and is then drawn up this shaft to the pit bank. The removal of the material from the working place to the shaft is known as haulage, and the raising to the surface as hoisting or winding. The efficient drainage and ventilation of mines are matters of the utmost importance, and require the constant

attention of the engineer in charge. As regards drainage, a mine which is worked on a hill-side by means of an adit drains itself as far as the workings situated above the adit are concerned. In all cases care should be taken to prevent the percolation of surface water into

the mine by efficient surface drainage, and underground inflows of water should also be shut off by suitable means. In cases where the quantity of water is not excessive, it is often removed by special buckets lowered and raised by the winding machinery, but the principal method of removing the water is by means of pumps. In certain districts, drainage is effected by co-operative pumping agencies, a good example in this country being the coal-fields of South Staf-

fordshire and East Worcestershire, which are drained by the South Staffordshire Mines Drainage Commission.

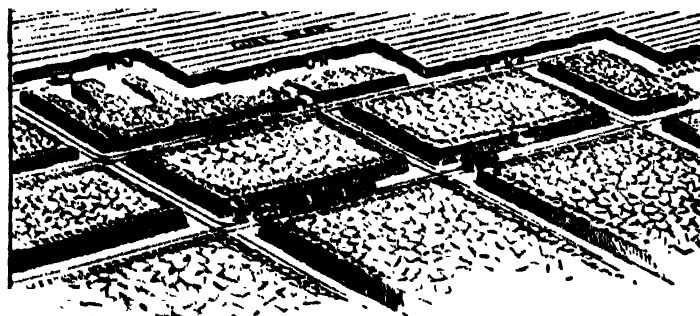
Of equal importance with drainage is the efficient ventilation of the mines, as the mine air is subject to various influences which are constantly rendering it less fit for supporting life. Various noxious gases escaping from the rocks into the workings, respiration of miners



Winning Coal by 'Bord and Pillar' or 'Pillar and Stall'

At the left, a miner shaping the 'bord' (roof removed); at right, a plan of workings.

of coal and iron ore. Two important modifications of this process may be described here, viz. the pillar and stall method, and the longwall method. The pillar and stall method consists in cutting passages in the coal towards the boundaries of the deposit, but leaving a con-

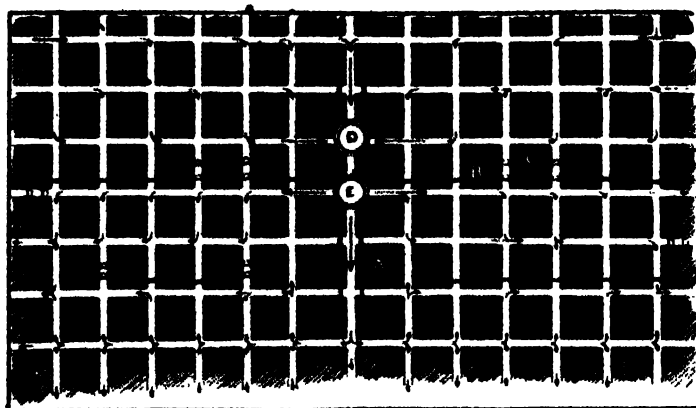


Winning Coal by 'Longwall'

Roof removed to show workings. Roads are formed with 'goaf' and fallen roof.

siderable quantity in the form of large pillars; the result at this stage being that the coal is blocked out into large rectangular masses with passages all round. Then the attack on the pillars commences at the boundaries, only sufficient of each block being left to keep out the rubbish and to prevent the too early fall of the roof. In the longwall method of working coal, the mineral is removed in one operation by the

and animals in the pits, combustion products of candles and lamps used for the illumination of the working places, explosions of gun-powder, &c., used for blasting, all vitiate the atmosphere to a considerable extent; and in addition to these causes there may be underground fires, explosions of fire-damp and coal dust, and the effects of the decay of timber. The most important gases which issue from the rocks are: (1) methane (q.v.), an inflammable gas which forms explosive mixtures with air and is the chief constituent of 'fire-damp' (q.v.); (2) carbonic acid gas, which is non-combustible, and is the chief constituent of 'black-damp'.



Plan showing Method of Ventilating Mine

A, Pillars of coal. B, Stoppings to keep air in the right passages. C, Double doors for communication, acting as stops. D, Upcast shaft. E, Downcast shaft.

Carbonic acid gas also results from the breathing of animals and from underground fires, explosions, &c. Two systems are used for the ventilation of mines, viz. natural and artificial. In the former method, currents of air are set up by natural differences of temperature, but these are often inconstant, and the artificial method is mostly used. In this method the movement of the currents of air is assisted, either by artificial heat or by mechanical means. By placing a furnace at the bottom of one of the shafts, the temperature of the air in this shaft may be raised, thus rendering it lighter than the air in a second similar shaft in communication with the first, so that a current of air is produced, descending by the second or cold shaft, traversing the workings, and ascending the heated shaft. In modern mines, the furnace or heating method of ventilation has been largely replaced by ventilating fans, which are arranged as exhausters, that is they suck air out of the mine, its place being immediately taken by fresh air entering at one of the shafts.

In underground workings, artificial light is a

necessity during the whole of the working hours, and the methods of illumination vary considerably in different mines. Candles, generally of the 'common dip' or tallow kind, are largely used, being held in lumps of clay. Open lamps of various kinds burning oil are frequently used, but not to a great extent in English and Welsh mines. Miners' safety lamps have to be used in certain coal-mines as they are constructed in such a manner as to be incapable of igniting fire-damp. Electric lamps have more recently been introduced on a considerable scale in modern mines.

The mining industry differs appreciably from most other industries in being regulated by special statutes. Owing to the dangers to life and health involved in mining occupations, all operations are subject to rigorous inspection by Government Inspectors of Mines (see *Mine Inspection*). To indicate the enormous quantities of minerals which are mined during the course of a year, the following figures are given in connection with the two chief minerals, viz. coal and iron. In 1920, 220,532,000 tons of coal were produced in the United Kingdom, 239,075,000 tons in Germany, and 576,485,000 tons in the United States;

in the same year 12,707,475 tons of iron ore were produced in the United Kingdom, 13,648,257 tons in France, and 67,773,000 tons in the United States. — BIBLIOGRAPHY: Robert Peele, *Mining Engineers' Handbook*; G. J. Young, *Elements of Mining*; Sir C. Le Neve Foster, *The Elements of Mining and Quarrying, and Ore and Stone Mining*; H. C. Hoover, *The Principles of Mining*; Arthur J. Hoskin, *The Business of Mining*; T. H. Cockin, *Coal Mining*; H. W. Hughes, *Text-book of Coal Mining*.

Ministry of Agriculture and Fisheries, a British ministry, formerly a board, established in 1880, for the furtherance of agricultural interests within the United Kingdom. It collects and publishes statistics of agriculture; issues regulations regarding cattle diseases; administers the Small Holdings and Allotments Acts and the provisions of the Corn Productions Act of 1917. The supervision of the Royal Botanic Gardens, Kew, was undertaken by this Ministry (then a board) in 1903. The British fisheries, sea and freshwater, are under this Ministry. Under the Scottish 'Small Landholders Act' (1911), a

separate Board of Agriculture was established for Scotland. Its functions are somewhat different from those of the English Ministry through the difference in Scottish agricultural organization.

Min'lum, the red oxide of lead, often designated *red lead*, and commonly used as a pigment for ordinary purposes. See *Lead*.

Min'lver, the Siberian squirrel, a variety of the common European species (*Sciurus vulgaris*), with grey or white fur; also the fur itself.

Mink, the name of North American, Siberian, and European mammals, allied to the polecat. They are semi-aquatic, burrowing on the banks of rivers and ponds, living on frogs, crayfishes, and fishes, which they pursue in the water. They exhale a strong odour of musk, and their fur is in considerable request.

Minneapolis, a city of Minnesota, United States, county seat of Hennepin county; on the Mississippi, at the Falls of St. Anthony; and served by the Chicago, Milwaukee and St. Paul, and other railways. The public buildings include the University of Minnesota (founded 1808), and a school of arts. The principal industries are the manufacture of flour, engines, boilers, agricultural implements, carriages, wagons, and pork-packing. Minneapolis is an important centre of the grain trade. The city owns a territory of about 33 sq. miles, with the celebrated Falls of Minnehaha and several fine lakes. Pop. (1910), 301,408; (1920), 380,582.

Minnesingers, or **Minnesänger** (O.Ger. *minne*, love), a class of German lyric poets of the twelfth and thirteenth centuries, so called from love being the chief theme of their verse. They were knights, or at least men of good family, who, after the fashion of the Provençal troubadours, engaged in poetical contests for the gratification of princes and ladies of the court. The most prominent names among the minnesingers are those of Wolfram von Eschenbuch, Gottfried von Strassburg, Hartmann von der Aue, and Walther von der Vogelweide. They sang their lyrics to the accompaniment of the viol, generally in honour of high-born ladies. The songs, chiefly in the Swabian dialect, were seldom written down by their authors, and the manuscripts which contain their verse are mostly the result of oral traditions and repetitions. The largest collection of their songs was compiled by Rüdiger von Manesse, burgomaster of Zürich in the early part of the fourteenth century, and a good selection was published by Bartsch, entitled *Deutsche Liederdichter* (Leipzig, 1804). This remarkable poetical movement gradually merged into that other class of German lyric poets called *Meistersingers*. See *Meistersingers*.—Cf. F. Grimm, *Geschichte der Minnesinger*.

Minnesota, a west-north-central state of the United States, bounded on the north by Manitoba-Ontario, with a coast-line on Lake Superior, to the west of which it lies. It is traversed by the Red and Minnesota Rivers, and by the headwaters of the Mississippi, which rises within the state in Lake Itasca. The state capital is St. Paul (pop. 234,595), but Minneapolis is the largest town; others are Duluth (pop. 98,917), an important port on Lake Superior, and Winona (pop. 19,143). There is an Indian Reserve of 805 sq. miles (1919); pop. 12,477. Minnesota is mainly an agricultural area, producing maize (118,125,000 bushels in 1920), wheat (29,116,000 bushels), oats, barley, and flax-seed. Dairying and sheep-farming are progressive. 1,044,233 acres are afforested (1919). Iron ores (mostly red hematite) are worked in the Mesaba and Vermilion ranges, west of Lake Superior; granite, limestone, and sandstone are also produced. Manufactures are principally of leathers, clothing, and machinery. Higher education is provided by the State university at Minneapolis; Hamelin University, St. Paul; and St. John's (R.C.) University, Collegeville (founded 1857). Area, 84,682 sq. miles, of which 3824 sq. miles are water; an additional area of 2514 sq. miles on Lake Superior is technically included in Minnesota.

Minnesota was explored in 1766, and was admitted to the Union on 11th May, 1858. It is divided into eighty-six counties, and the administration comprises a Governor, Senate (67 members, elected for four years), and a House of Representatives (131 members, elected for two years). Two Senators and ten Representatives are sent to Congress.—Cf. W. W. Folwell, *Minnesota* (in American Commonwealth Series).

Minnow (*Leuciscus phoxinus*, or *Phoxinus phylla*), a species of freshwater fish belonging to the carp family. They swim in shoals, seldom exceed 3 inches in length, and make excellent bait for trout. They are distributed throughout Europe (except Spain and Portugal), Russian Turkestan, and Siberia. In America various small fish receive this name.

Minor, a person of either sex under age, who is under the authority of his parents or guardians, or who is not permitted by law to make contracts and manage his own property, or who has limited powers of so doing and is held entitled to special protection. (See *Age*.) The term occurs mainly in Scots law, and there signifies, in its strict sense, a person between pupillarity and majority, i.e. if a female, between twelve and twenty-one years of age, and, if a male, between fourteen and twenty-one years. Such a person is capable of consent and therefore of entering into contracts, but only with consent

of his curator if he have one. There are, however, certain acts he cannot do even with such consent, e.g. discharge debts gratuitously, make a donation, dispose of his heritage by will, &c., and he has certain administrative and public disabilities, while debts granted by him can, as a general rule, be reduced within four years after attaining majority on the ground of minority and lesion.

Minorca (Sp. *Menorca*), the second largest island of the Balearic group, in the Mediterranean. It is separated from the largest island, Majorca, by a strait 27 miles broad. The surface is hilly. Port Mahon, a naval station and seaport, is the capital. It has a wireless station. Minorca was ceded to Spain by Britain in 1802 (Peace of Amiens). Area, 290 sq. miles; pop. about 40,000.

Minos, in Greek mythology, a ruler of Crete, said to have been the son of Zeus and Europa, and a brother of Rhadamanthus. During his lifetime he was celebrated as a wise lawgiver and a strict lover of justice, and after his death he was made, with Aeacus and Rhadamanthus, one of the judges of the infernal world. The story evidently contains reminiscences of Cretan supremacy in the Aegean. This theory is sup-

ported by recent discoveries, which tend to prove the existence of a powerful kingdom of Crete during the Mycenaean Age.

Minsk, a town of Russia, capital of the government of same name, on the Svislotch. It has some manufactures and a considerable general trade. Fighting took place at Minsk during the European War, and in 1920 between the Bolshevik army and the Poles. Pop. 117,000.—The government, which has an area of 85,290 sq. miles, has extensive forests and great stretches of marsh or swamp. Pop. (1915), 3,070,900.

Minstrel, a singer and musical performer on instruments. In the Middle Ages minstrels were a class of men who subsisted by the arts of poetry and music, and sang to the harp or other instrument verses composed by themselves or others. The name was introduced into England by the Normans. The person of the minstrel was sacred; his profession was a passport; he was "high placed in hall, a welcome guest". So long as the spirit of chivalry existed the minstrels were protected, but they afterwards sank to so low a level as to be classed, in the reign of Queen Elizabeth, with beggars and vagabonds.



Peppermint
(*Mentha piperita*)



Pennyroyal
(*Mentha pulegium*)



Spearmint
(*Mentha viridis*)

Mint Plants with Details of Flowers

ported by recent discoveries, which tend to prove the existence of a powerful kingdom of Crete during the Mycenaean Age.

Minotaur, in Greek mythology, a monster fabled to have had the body of a man with the head of a bull, and to have fed on human flesh, on which account Minos shut him up in

Mint, the name given to several herbaceous aromatic plants of the genus *Mentha*, nat. ord. Labiatae. They are nearly all perennial, having square stems which bear opposite and simple leaves; they are widely distributed throughout temperate regions; and they abound in resinous dots which contain an essential oil. Mint has

an agreeable odour, and partakes in the highest degree of tonic and stimulating properties. Spearmint (*M. viridis*) is generally used, mixed with vinegar and sugar, in sauce. Peppermint (*M. piperita*) yields the well-known stimulating oil of the same name. Pennyroyal (*M. Pulegium*) is used for the same purposes as peppermint.

Mint, the place where a country's coinage is made and issued under special regulations and with public authority. In England there was formerly a mint in almost every county; the sovereign, barons, bishops, and principal monasteries exercised the right of coining; and it was not till the reign of William III that all the provincial mints were abolished. The present mint on Tower Hill, in London, was erected between the years 1810 and 1815. In former times the coinage was made by contract at a fixed price. The English mint is the centre of supply for the British Empire, but Australia has branch mints at Sydney, Melbourne, and Perth. In the United States there are several mints, the chief being at Philadelphia. In France, as in England, the number of mints was at one time considerable. See *Coining*.

Minuet, a slow, graceful dance said to have been invented in Poitou, in France, about the middle of the seventeenth century, performed in $\frac{3}{4}$ or $\frac{3}{8}$ time. The term is also applied to a tune or air to regulate the movements in the dance, or composed in the same time.

Miocene (Gr. *miōn*, less, *kainos*, recent), in geology (q.v.), the name given by Sir Charles Lyell to a subdivision of the Tertiary strata. The Miocene strata contain fossil plants and shells which indicate a warm uniform climate. The mammals are important, and foreshadow the animal life of the present day. No strata of Miocene age occur in the British Isles; but the system is excellently represented in Central Europe (Vienna basin) and elsewhere, and by freshwater and terrestrial beds, with some marine zones, in Switzerland and Northern France. The great Alpine mountain-building movements, which affected the whole globe, culminated in the last epoch of the Miocene period.

Mjøsen (myu'sen), the largest lake in Norway, about 40 miles S.E. of Christiania. It is 62 miles long and about 10 miles in greatest breadth, and its waters are carried by the Vorma to the Glommen.

Miquelon, an island of North America, in the Atlantic, close to the south coast of Newfoundland; a French possession. The southern part is known as Little Miquelon, and was until 1788 a separate island. It is now connected with Great Miquelon by a sandspit. Fishing is the only industry of economic importance. Area, 83 sq. miles; pop. 448. See *St. Pierre*.

Mirabeau (mê-râ-bô), Gabriel Honoré Riquetti, Comte de, French statesman, son of Victor Riquetti, marquis de Mirabeau, born in 1740 at Bignon, near Nemours, died at Paris—1791. At an early age he manifested extraordinary intelligence; but his youth was a stormy one, so much so that on several occasions he was imprisoned by his father under a *lettre de cachet*. It was during an imprisonment at Vincennes, which lasted three years and a half, that he wrote his *Lettres à Sophie*, *Lettres de Cachet*, and *L'Espion Dévalisé*. On his release from this prison he lived for some time in Holland and England, returning to France in 1785. On the assembling of the States-General, Mirabeau, elected for Aix, soon became prominent. When the king required the *tiers état* to vote apart from the other two orders, it was Mirabeau who counselled resistance, demanded the withdrawal of the troops, consolidated the National Assembly, and defied the king's orders. For some months he continued to lead, but he soon found that the members of the Assembly were mostly impractical and inexperienced men, whose chief function was to discuss an ideal Constitution. As a practical statesman Mirabeau desired action, and for this reason he attempted to form alliances with Lafayette, the duc d'Orleans, Necker, and finally with the queen. Correspondence with the latter was maintained through La Marck, and he received a subsidy from the royal party. No practical result followed from this secret alliance, for the queen rejected Mirabeau's counsel and suspected his methods of government. Whether he might ultimately have been able to guide the Revolution into peaceful ways has always been a matter of conjecture to historians, but this possibility was prevented by his death in 1791. This was regarded as almost a national calamity, and the people buried him with splendid pomp in the Pantheon.—BIBLIOGRAPHY: A. J. T. Mézères, *Vie de Mirabeau*; L. Barthou, *Mirabeau*; W. R. H. Trowbridge, *Mirabeau, the Demi-god*.

Mirabilis, a genus of plants, nat. ord. Nyctagineæ, one species of which, *M. jalapa*, is well known in gardens as the marvel of Peru. It is a native of South America.

Mirabilite, a mineral sodium sulphate, $\text{Na}_2\text{SO}_4 \cdot 10\text{H}_2\text{O}$, common as a product of desiccating lakes.

Miracle (Lat. *miraculum*, a wonder, a prodigy; in the original Greek *semeion*, a sign, *teras*, a wonder or prodigy), a suspension of, or deviation from, the known laws of nature, brought about by the direct interference of a supreme supernatural Being. It is in its nature, as the term implies, an occurrence which is strange, marvellous, inexplicable, and is usually connected

with some ulterior moral purpose. By the elder theologians a miracle was conceived to be the triumph of the Divine Will over the work of His hands and the laws of His making. In modern exegesis, however, the miraculous element is not considered to give evidence of opposing forces. On the contrary, a miracle is explained as a manifestation of the Divine Power working through laws and by methods unknown to us, and which, upon a higher plane, are altogether natural and orderly.

Miracle Plays. See *Drama*.

Mirage, an optical illusion caused by the curving of the rays of light in an atmosphere of varying density. As a rule, this curving is slight, and merely shifts objects, as seen, more or less out of their true position. The phenomena of *looming*, and of the *Fata Morgana*, are caused in that way. In looming, objects appear magnified and somewhat dim in their outlines; in the *Fata Morgana*, as seen especially in the Straits of Messina, objects on the shore appear much elongated in the vertical direction. Sometimes, however, and especially over hot desert sand, or over an Arctic ice-field, the bending is much greater, and may have a much more extraordinary effect. In the desert a ray passing from the top of a tree towards the ground is gradually bent upwards, and may be bent so much that it seems to come from a point underneath the level of the ground, so that the tree seems to be reflected in a lake. Over ice, an upward ray may be so bent downward that an inverted image of the object is seen in the sky. Whale-fishers quite often discover the presence of another ship in their neighbourhood by a reflection of this sort. Captain Scoresby, when sailing in Greenland waters in 1822, found out unexpectedly that his father was not far off, by recognizing the image of his ship in the sky.

Miramichi (mi-ra-mi-shé'), a bay and river of New Brunswick, Canada. The bay is 20 miles wide at its entrance and runs 21 miles inland. The river falls into the bay after a north-east course of about 90 miles, of which 40 are navigable for large vessels.

Miranda, a northern maritime state of Venezuela, on the Caribbean. It is mountainous in parts, but is one of the most fertile of Venezuelan coffee areas. Ocumare is the capital. Area, 3000 sq. miles; pop. about 176,000.

Mirandola, Giovanni Pico della, surnamed the *Phœnix*, born 29th Feb., 1463, died 17th Nov., 1494. He was the youngest son of Gianfrancesco della Mirandola, of the princely family of Mirandola. He studied at Bologna and at different towns of Italy and France, attending the most celebrated schools and most distinguished professors. He had few rivals as a finished scholar, and challenged disputation on

abstruse subjects in many of the universities. He endeavoured to harmonize the doctrines of Aristotle and Plato.

Mirfield, a town of England, West Riding of Yorkshire, on the Calder, near Huddersfield. It is served by the London & North Western and the Lancashire & Yorkshire Railways. There are coal-mines in the vicinity; cotton and woollen goods are manufactured. Pop. (1921), 12,183.

Mirror, a highly polished sheet of metal, which may be very thin; a mere film, in fact, protected by a sheet of glass. Light reaching the surface is largely reflected, and mirrors are used for that purpose and for the production of reflected images of objects facing them. The mirrors of the ancient Greeks and Romans consisted of thin discs of metal made slightly convex. The Japanese magic mirrors have the peculiar property, when a strong beam of light is reflected from them, of showing an image of the relief design on the back. This is due to the reflecting surface not being uniform, but pressed to the shape on the back in the process of polishing with the back against a hard surface. Until the middle of the nineteenth century glass mirrors were made with a tin amalgam backing, but in 1835 von Liebig discovered how metallic silver could be deposited from ammoniacal solutions of silver nitrate by the use of reducing agents. In the hot process the reduction is effected with tartaric acid at a temperature of about 40° C. Sugar is used for the same purpose in the cold process. The yellowish colour is removed by treating the deposit with cyanide of mercury, which makes the film more adherent. The silver is protected with shellac or copal varnish and a coat or two of red lead or electrically deposited copper. See *Reflection*.

Mirzapur, a city of India, in the Benares division of the United Provinces, on the Ganges. Pop. 32,000.—The Mirzapur district has an area of 5230 sq. miles. Pop. 1,072,000.

Misappropriation, in English law, is the wrongful appropriation by any person, to his own use, of money or property entrusted to him. It is dealt with under the Larceny Act. In order to prevent a servant from pretending to have given to his master's horse or other animal corn or other food which he has appropriated to his own purposes, the Misappropriation by Servants Act, 1869, provides that any servant who, contrary to orders, gives his master's corn, &c., to any animal belonging to his master, shall be liable to a penalty not exceeding £5.

Misdemeanour, an offence of a less serious nature than a felony, including generally all indictable offences which do not amount to felony, as perjury, libels, conspiracies, and assaults. See *Felony*.

Mishna (Heb., teaching), a collection or digest of Jewish traditions and explanations of Scripture, preserved by tradition among the doctors of the synagogue, till Rabbi Jehudah, surnamed the *holy*, reduced it to writing about the end of the second century. The *Mishna* is divided into six parts: the first relates to agriculture; the second regulates the manner of observing festivals; the third treats of women and matrimonial cases; the fourth of losses in trade, &c.; the fifth is on oblations, sacrifices, &c.; and the sixth treats of the several sorts of purification. See *Talmud*.

Misiones, a territory of the Argentine Republic, stretching as an arm between Paraguay and Brazil. The territory is hilly and afforested, but stock is raised, and sugar, timber, tobacco, and yerba maté are produced. Posadas, on the Parana, is the chief town. Area, 11,511 sq. miles; pop. (1920), 60,894.

Miskolcz, a town of Hungary, on the Sajo, and connected by rail (116 miles) with Budapest. The wheat and cattle trade and flour milling are important. Pop. 50,000.

Mispickel, arsenical pyrites, FeAsS , an ore of arsenic, containing this metal in combination with sulphur and iron, sometimes found in orthorhombic crystals, but more often massive. It is grey, with metallic lustre, and not scratched by a knife.

Misprision, in law, any high offence under the degree of capital, but nearly bordering thereon. Misprision is contained in every treason and felony. *Misprision of felony* is the mere concealment of felony. *Misprision of treason* consists in a bare knowledge and concealment of treason, without assenting to it. Maladministration in officers of high public trust is a *positive misprision*.

Misrepresentation, in law, a false statement of fact. Any party who has been induced to enter into a contract by the material misrepresentation, however innocent, of the other party may repudiate the contract and be restored to the same position as before, that is to say, the contract is voidable. But unless the statement was knowingly false, or made recklessly without due regard to the truth, or warranted, the injured party cannot claim damages. In contracts of insurance, where the utmost good faith is necessary, non-disclosure of any material circumstance which would influence a prudent insurer in accepting or rejecting the risk or in fixing the rates of premium is misrepresentation rendering the contract voidable. If the statements made are warranted, any misrepresentation, though not material to the risk, may render the contract void.

Missal, in the Roman Catholic liturgy, the book which contains the prayers and ceremonies

of the Mass. The greater part of these prayers and ceremonies are very ancient, and some of them have come down from the times of the Popes Gelasius I (end of fifth century) and Gregory the Great (end of sixth century); some are even older. The *Missal* was revised by the Council of Trent, its adoption by the whole Catholic Church demanded by Pius V in 1570, and in this form it is still retained. In England before the Reformation there were missals of the Sarum use, Lincoln use, Bangor use, &c. Before the invention of printing the writing of missals ornamented with illuminated ornaments, initials, miniatures, &c., was a branch of art raised to high excellence in the monasteries.

Missing Quantity, a term used by engineers to denote the difference in quantity of steam used by an engine, as shown by the indicator diagram (see *Indicator*), and actually as obtained by condensing and measurement. The question of how this steam passes through the engine has been the subject of considerable dogmatic assertion based on assumptions, denied by the evidence of analogous physical actions and by actual steam-engine research. It has been assumed, in the *initial condensation theory*, that the metal wall of an engine cylinder goes through the same temperature cycle as the steam, and that steam is condensed on entering, of which a part is re-evaporated later in the cycle. The difference between this condensation and re-evaporation is taken to account for the missing quantity. Professor J. H. Cotterill, as early as 1872, in his book *The Steam Engine*, pointed out that these suppositions would account for a missing quantity many times that ever found. Professors H. L. Callendar and John T. Nicolson, at the McGill University, Montreal, in 1895, actually tested the temperature cycles in the metal wall of a steam-engine cylinder, and found the exceedingly small temperature range it was subjected to, and also discovered the means of determining the actual condensation and re-evaporation. They found that the major part of the missing quantity was due to leakage past the moving valves, and investigated the nature of this action (see *Law of Condensation of Steam*, Proc. Inst. Civil Eng., vol. cxxxi). Professor A. L. Mellanby (see Proc. Inst. Mech. Eng., June, 1905) continued this work by investigating the effects of steam jacketing on the missing quantity. His work confirmed that of Callendar and Nicolson, and extended considerably the knowledge we have of the temperature actions in engine cylinders and at valve seats. It is interesting to note that whenever a gain in economy is obtained by the use of superheated steam, compounding, increasing the speed of running, or other similar change, the

gain is mainly produced by a reduction in the missing quantity.

Missions. Christianity claimed to be a world-religion and not merely the faith of a single race, and from the first was missionary in its aim and methods. The earliest Church was a missionary Church, and by the end of the fifth century the larger part of the civilized world had been Christianized. With the decline of spiritual life missionary activity practically ceased, leaving the field open for the conquests of Mahomedanism. Medieval effort was restricted in scope and meagre in results, but with geographical discovery the zeal of the Church reawakened, and much was accomplished by the Jesuits, though their policy was chiefly to convert by compulsion. To this day traces of their influence can be found in East Central Africa and along the West Coast. The Reformation brought no increase of interest in the missionary enterprise; the eighteenth century saw tentative measures being taken; but it was not until the beginning of the nineteenth century that Christendom shook itself free from a parochial conception of the Gospel and--largely through societies independent of the Churches--inaugurated the modern era of missions. The view prevalent then was that non-Christian peoples were outside the divine pale, and the missionary appeal was based on vivid pictures of multitudes of lost souls perishing every moment. At first, therefore, the object of the missionaries was simply conversion. It was recognized, however, that evangelism was not enough, that little progress could be made until converts were able to read and write, and elementary schools were the result. These were followed, as the need arose, by institutions of a higher grade. It was also realized that the people had to be taught to use their hands in order to improve their social environment and economic status, and industrial and agricultural training was added to preaching and teaching; and, in countries where the caste system prevailed, farm colonies and co-operative banks were formed to provide self-contained communities where the converts could live in security and peace.

Medical work was also inevitable; every missionary found himself besieged by the sick and diseased, who had absolute faith in his healing power, and dispensaries and hospitals came naturally to be indispensable adjuncts of all important missions. There was no co-ordination in the policy or the activities of the missionaries, but in the course of time their united efforts began to tell: intelligence, ambition, and habits of industry were developed, and gradually a new social order was established in the regions under their influence. Unconsciously they made mistakes; they failed to recognize that the

great race-religions contained elements of good. Instead of realizing that each race had innate qualities capable of utilization in the interests of Christianity, they adopted the attitude of superior beings bringing a superior religion to replace what they considered to be pure superstition and idolatry. The tendency was to impose their own ways of thought and life on the natives. In this way Christianity everywhere came to be regarded as the white man's religion, and was associated with a change to foreign dress and customs. It was accompanied not only by social disintegration but by a process of denationalization. The effect was not at first appreciated by the missionaries. Their work continued, along with the material agencies of Governments, to foster the moral and mental enlightenment of backward peoples until the European War revealed the remarkable extent to which race-consciousness and national dignity and aspiration had, largely by their efforts, been evolved. Missionaries, and British missionaries in particular, were faced with an entirely new set of problems. The general desire for self-determination and self-government extended to the mission communities, and the local Churches pressed for a fuller measure of responsibility. In India the political and religious questions were intermixed, but the anti-British movement was directed not so much against Christian ideals as against the ideas and methods of Western civilization.

Underlying the African attitude was resentment on the part of educated natives at the manner in which they were treated by the white population. This race assertion on the part of their wards proved disconcerting to missionaries, although it was the natural outcome of their work, and they were divided in their view as to the measure of freedom it would be wise to give. But since each race might have a distinctive contribution to bring to the evolution of Christianity and the enrichment of the moral force of the world, it was generally agreed that foreign influence and authority should gradually decrease, and that the native Christian Church should be allowed to develop autonomously along the line of its own genius. The enterprise in the field still consists of a multitude of isolated and unrelated activities, but at the home base there is a certain amount of unified effort, while the subject of missions is treated in a more scientific spirit, and the literature connected with it is becoming more attractive and readable. Women are also taking a larger share in the enterprise, both in the sphere of administration and in every department of the work abroad. The actual results in the various fields, and as a whole, are extremely difficult to estimate; statistics are incomplete and unreliable,

and they do not indicate the extent of the indirect influence wielded by the missions. In some areas the accessions to the Christian community outnumber the natural increase of population; in others they exceed it. The idea that the world can be evangelized, with existing forces, in a generation or two is not now entertained, and a more sober view is taken of the situation, though the possibility of mass movements is not ignored. The hope for the future lies in the multiplication of native evangelists, and the tendency is to concentrate missionaries at central stations and use them chiefly for teaching and training these agents. Interest in the work on the part of the general public is growing, in the belief that it is the only certain means of bringing about world brotherhood and peace.

Mississipp'pl ('Great Water'), the principal river of North America, and one of the largest rivers in the world. It has its source in Lake Itasca, state of Minnesota, whence it issues about 12 feet wide and 2 feet deep; from thence it trends southward through a number of lakes and over a series of rapids until the Falls of St. Anthony are reached; below this it receives the Iowa, the Illinois, and the Missouri as tributaries, but the latter is really the main stream, having a length of 2008 miles before the rivers unite, while that of the Mississippi is only 1330 miles. From St. Louis, a little below their confluence, the Mississippi becomes a broad, rapid, muddy river, liable to overflow its banks; lower down it receives in succession the Ohio, Arkansas, and Red Rivers, and it finally enters the Gulf of Mexico through a large delta with several 'passes', some distance below New Orleans. The combined lengths of the Missouri and Mississippi are about 4200 miles; the whole area drained by the Mississippi is 1,240,000 sq. miles; the maximum flood volume reaches 1,400,000 cubic feet per second below the Ohio; and the sediment transported to the gulf annually would make a solid block 1 mile square and 200 feet high. Above its junction with the Ohio at Cairo the river enters upon a large alluvial basin, bounded on both sides by high bluffs, and through this plain the river winds for about 1150 miles. The volume is usually smallest in October and greatest in April, and the low-lying lands are subject to terrible floodings during the spring freshets. At many places attempts have been made to secure the river within its banks and save the country from loss and suffering by building dikes, or levees as they are called. The sediment carried down, however, is continually raising the bed of the river, and thus breaks are frequently made in these levees. The most important towns on the river banks are St. Paul, St. Louis, Cairo, Memphis, Vicksburg, Natchez, and New Orleans.

Mississippi, an east-south-central state of the United States, with a coast-line of 85 miles on the Gulf of Mexico (Mississippi Sound). The Mississippi forms the western boundary for 530 miles. Near the Gulf of Mexico the country is low and swampy; the central part is hilly and mainly prairie-land; a large area in the north-east is afforested. 7000 sq. miles along the Mississippi and in the Yazoo delta consist of rich bottom-lands. The climate is subtropical. Jackson (pop. 1920, 22,679) is the state capital, Meridian (about 23,400), and Vicksburg (about 17,000) are other towns. Of religions, one-half of the state population is Baptist and one-third is Methodist. The state is mainly devoted to agriculture, cotton (885,000 bales in 1920), maize (63,680,000 bushels, 1920), rice, wheat, oats, and potatoes being produced. There is some dairying and sheep-farming. Among minerals are coal and gypsum, but the mining industry is undeveloped. 4447 miles of steam and 117 miles of electric railway track traverse the state (1919), the principal lines being the Yazoo & Mississippi Valley; Illinois Central; Mobile & Jackson & Kansas City; Southern; and the Mobile & Ohio Railways. Education is not compulsory; the colour-line is rigid, and black children are kept strictly separate from white. There are six universities and colleges, including an Agricultural and Mechanical College, for negro youths, and an Industrial Institute-College, devoted to young women. Area, 46,865 sq. miles, 503 sq. miles being water; pop. (1920), 1,700,618.

Mississippi was first permanently settled as part of Louisiana in 1716, when some Frenchmen founded Natchez, then called Fort Rosalie. The territory was admitted to the Union as a state on 10th Dec., 1817. It is divided into seventy-nine counties, and the administration is controlled by a Governor and a Legislative, comprising Senate and House of Representatives, both elected for four years. Two Senators and eight Representatives are sent to Congress.—*Cf. Encyclopedia of Mississippi History (1540-1907) (2 vols.)*.

Missolonghi (mis-o-lon'gê), a town of Greece, capital of the nomarchy of Acarnania and Ætolia, near the Gulf of Patras. It is notable for its gallant resistance in 1821 and in 1825-6 to a large Turkish army. Lord Byron died there in 1824, and a cenotaph has been erected to his memory. Pop. 10,000.

Missouri (mi-sô'rê), a river of North America, which is formed in the Rocky Mountains, in Montana, winds circuitously along the base of the mountains, then east till it reaches the western boundary of North Dakota, and receives the Yellowstone. Here it begins to flow south-eastwards through North and South Dakota,

then forms the eastern boundary of Nebraska, separating it from Iowa and Missouri; separates for a short distance Kansas from Missouri, then strikes eastwards across the latter state, and joins the Mississippi after a course of 2908 miles. It is navigable 2500 miles from the Mississippi. Its affluents are very numerous on both banks, but by far the most important of them are the Yellowstone, the Nebraska or Platte, and the Kansas, all from the west.

Missouri, a west-north-central state of the United States, between Iowa (north) and Arkansas (south), bounded by the Mississippi (east), and traversed from east to west by the Missouri. Jefferson City (pop. 1920, 14,067) is the state capital; other towns are St. Louis (772,897), Kansas City (324,410), St. Joseph (77,939), and Springfield (39,620). Missouri is mainly devoted to agriculture, and produces maize (108,880,000 bushels in 1920), wheat (32,721,000 bushels in 1920), oats, potatoes, and sorghum. In the south-eastern lowlands cotton (85,000 bales, 1920) and flax-seed are produced. Tobacco (6,000,000 lb., 1920) and fruit are also cultivated; dairying and sheep-farming are progressive. Stock-raising, and particularly the breeding of hogs, is important. Among minerals, copper, limestone, sandstone, granite, and red and brown hematite iron are worked; the coal-fields occupy 14,000 sq. miles (estimated). Missouri is the greatest zinc- and lead-producing state of the Union, the ores at Mine La Motte containing also cobalt and nickel. About 8300 miles of railway and 1174 miles (1910) of electric track traverse the state, the principal railways being the Missouri Pacific; Atchison, Topeka, & Santa Fé; St. Louis South-Western, and the St. Louis & San Francisco systems. In addition there is a heavy traffic of river steamers between St. Louis and the Gulf of Mexico. Education is free and compulsory between the ages of eight and fourteen years. Higher education is provided by the State university (Columbia), founded in 1847; by the St. Louis University (R.C.), founded in 1818; and by many other colleges. Area, 69,420 sq. miles, of which 693 sq. miles are water; pop. (1920), 3,404,055.

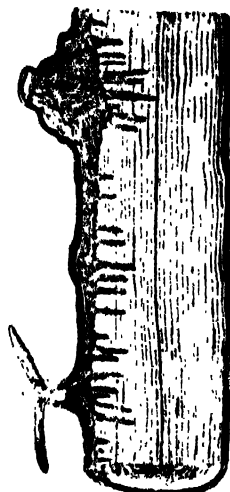
Missouri originally formed a part of Louisiana, and the district was bought by the United States in 1803, a territory being created in 1812. On 2nd March, 1821, it was admitted as a state to the Union. There are 114 counties. The administration comprises a Governor, Senate (34 members, elected for four years, one-half seeking re-election every two years), and a House of Representatives (142 members, elected for two years). Two Senators and 16 Representatives are sent to Congress.—*Cf. Missouri (in American Commonwealth Series).*

Mistas'sini, a large lake of Quebec, Canada,

drained to Hudson Bay by the Rupert River. A chain of small islands divides it into two distinct basins. Length, about 100 miles; breadth, 15 to 22 miles; depth (average), 400 feet.

Misti, El, a snow-capped, extinct volcanic peak of Peru, in the department and overlooking the town of Arequipa. Altitude, about 19,000 feet.

Mistletoe, the *Viscum album* of botanists, nat. ord. Loranthaceæ, a European plant growing parasitically on various trees, and celebrated on account of the religious purposes to which it was consecrated by the ancient Celtic nations of Europe, being held in great veneration by the Druids, particularly when it was found growing on the oak. It is a small shrub, with sessile, oblong, entire, somewhat leathery leaves, and small, yellowish-green flowers, the whole forming a pendent bush, covered in winter with small white berries, which contain a glutinous substance. It is common enough on certain species of trees, such as apple and pear trees, hawthorn, maple, lime, and other similar trees, but is very seldom



Section of Branch of Tree with Parasitic Mistletoe

found on the oak. Its roots penetrate into the substance of the tree on which it grows, and eventually it kills the branch supporting it.

Mistral, Frédéric, Provençal poet, the leader of the modern Provençal revival in France, was born at Maillane in 1830, died in 1914. His first important work was the epic poem *Mirèio* (popular as the opera *Mirille*, with music by Gounod), which appeared in 1850. Another epic, *Calendou*, came out in 1867; a volume of poems, *Las Iaclo d'Or*, in 1870; *Lou Trésor d'ou Felibrige*, a dictionary of modern Provençal, in 1878-86. In 1900 appeared *Mes origines, mémoires et récits*; in 1910 a Provençal translation of *Genesis*; and in 1913 a collection of his poems, entitled *Oulivado*. In 1904 Mistral shared the Nobel Prize for Literature.

Mistral, a violent, cold north-west wind experienced in Provence and other neighbouring districts bordering on the Mediterranean, and destroying crops, fruit, blossom, &c. It blows with greatest violence in autumn, winter, and early spring.

Mite, a name common to numerous small,

In some cases microscopic, animals, of the class Arachnida (spiders) and ord. Acarina. The two pairs of jaws (chelicerae and pedipalpi) are variously modified for sucking, piercing, and biting. Some are of a wandering character, and are found under stones, leaves, and the bark of trees; or in provisions, as meal, cheese, pepper, &c.; others are plant parasites; and many are parasitic on or in the skin of various animals, sometimes proving of serious injury to them. The following are common species: black currant gull-mite (*Eriophyes ribis*), the cause of 'big bud'; itch-mites (*Sarcoptes*); cheese-mites (*Tyroglyphus*); red 'spider' (*Tetranychus telarius*); harvest-mites (*Trombidium*), of which the minute larvae are known as harvest 'bugs'.

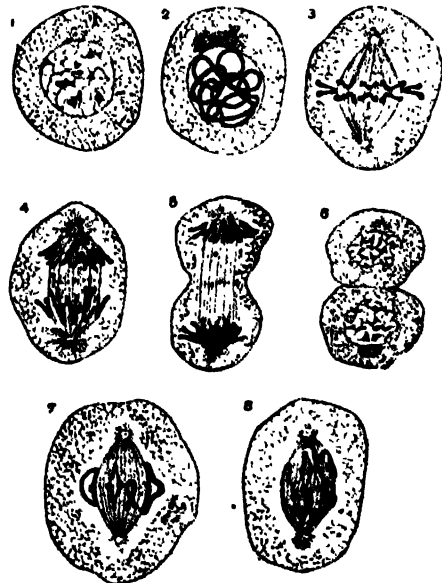
Mitford, Mary Russell, English authoress, daughter of a physician at Alresford, Hampshire, and born there 1787, died 1835. Her best-known work is *Our Village*, a series of prose sketches descriptive of English country life and scenery, drawn from the village of Three Mile Cross, near Reading. A subsequent work, *Belford Regis, or Sketches of a Country Town*, was nearly equally popular.

Mitford, William, English historian, born 1744, died 1827. He studied at Queen's College, Oxford, and entered the Middle Temple, but early quitted the profession of law, and obtained a commission in the Hampshire Militia, of which he became colonel. His early fondness for Greek led him to undertake a *History of Greece*. The first volume appeared in 1784; the fifth and last, bringing the narrative down to the death of Alexander the Great, was published in 1818. Despite its strong anti-democratic prejudices, until the appearance of the works of Thirlwall and Grote his history was considered the standard.

Mithras, the Mitra of the Rig Veda, the sun, or the genius of the sun, with the Persians, which was worshipped as a deity at a later period also in Rome. Mithras stands as mediator between Ormuzd and the world. The cultus of Mithras found its way into all parts of Europe visited by the Roman legions. In Germany many tokens of its former existence are still to be found, such as the monuments at Hedernheim, near Frankfurt-on-the-Main.

Mithridates, or Mithradates, King of Pontus, on the southern shore of the Black Sea, surnamed the Great. His father was murdered 120 B.C., and Mithridates ascended the throne at the age of thirteen. Soon after attaining his majority he commenced his career of conquest, which made him master of nearly all Asia Minor, besides Greece, and brought him into conflict with Rome. In 88 B.C. Sulla led a Roman army into Greece, and restored the Roman power in that country. For four years Mithridates disputed possession of Asia, but was at last com-

pelled to succumb, 84 B.C., and to confine himself to his hereditary dominions, though he soon again began the war. After the death of Sulla, which occurred in 78 B.C., Mithridates levied another army with a determination to expel the Romans from Asia. Being defeated by Lucullus, who was appointed consul 74 B.C., he was followed by the victorious Romans into his own states, and driven to seek a refuge in Armenia, then ruled by Tigranes, who refused to deliver him up. Here Mithridates raised a third great army, and in 67 B.C. completely defeated the Romans under Triarius, the lieutenant of Lucullus, who had been recalled; and, following up his success, rapidly recovered the larger part of his dominions. The Romans now invested Pompey with absolute power in the East, and by him, in 66 B.C., the forces of Mithridates were completely routed near the Euphrates. The king retired to Bosphorus (the Crimea), where his troops, headed by his son Pharnaces, broke out in mutiny, and Mithridates killed himself, 63 B.C.



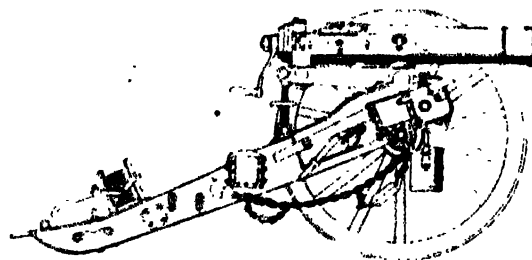
Mitosis

Ordinary Mitosis: 1, Resting stage, network of chromatin. 2, Chromatin in skin, centrosome dividing. 3, Chromosomes at equator of spindle, at each end of which is a centrosome. 4, Half chromosomes travelling to poles of spindle. 5, Half chromosomes at poles, cytoplasm constricting. 6, The two daughter cells with reconstructed nuclei. Reducing Mitosis (Meiosis): 7, Nuclear spindle formed, and chromosomes united in pairs. 8, The halves of each pair have separated and are travelling to the poles of the spindle.

Mitosis, or Karyokinesis, indirect cell division, in which remarkable changes take place in the nucleus. The deeply staining substance (chromatin), which this contains, becomes a

convoluted thread, that breaks up into a number (constant for a given species) of minute curved pieces, the chromosomes. At the same time the nuclear membrane disappears, and a spindle-shaped aggregate of delicate fibres comes into existence. The chromosomes collect together at the equator of the spindle, each divides longitudinally into halves, and these travel away from each other to the poles of the spindle. In animal cells this process appears to be directed by a minute body, the centrosphere, usually placed just outside the nucleus. This divides into two, each half travelling to one pole of the spindle. Simultaneously with the changes described, the extra-nuclear protoplasm (cytoplasm) divides, so that in the end the original cell is divided into two daughter cells. Chromosomes are believed to be linear aggregates of minute particles serving as the bearers of hereditary characters, and the complex process just outlined secures qualitative as well as quantitative halving of the chromatin between the two daughter cells. In the maturation of sex-cells 'reducing' division takes place, so that a mature ovum or sperm contains only half the normal number of chromosomes. When, in fertilization, a sperm fuses with an ovum the full number is restored. Sex is perhaps determined by an extra or 'odd' chromosome that has been described in a number of cases. BIBLIOGRAPHY: E. B. Wilson, *The Cell*; W. E. Agar, *Cytology*; L. Doncaster, *Text-book of Cytology*.

Mitrailleuse, the name by which machine-guns are known in the French army. The word is derived from *mitraille*, meaning grape-shot, and was originally given to the first machine-gun used in the French army in 1870, i.e. 'the thrower or distributor of grape-shot'. It is still



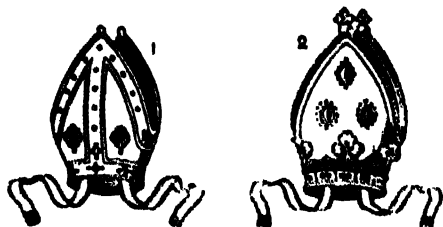
Mitrailleuse, early form

used in France as the general name for machine-guns, though the original type has long since given place to an improved Hotchkiss gun.

When originally invented, the mitrailleuse consisted of thirty-seven barrels enclosed in a cylinder or tube, looking, when mounted on a gun-carriage, much like an ordinary field-gun. The gun was loaded by means of a steel disc or plate, which,

after the cartridges had been inserted, was dropped into grooves in the breech-block. The breech was then closed by means of a lever, the same motion preparing the gun for firing. Each round could be fired separately or so quickly as to be almost instantaneous, one complete revolution of the firing-handle only being necessary. The breech was then opened, and the disc with the fired cases removed and replaced by another. See *Machine-gun*; *Hotchkiss Gun*.

Mitre (Lat. *mitra*; Gr. *mitra*, mitre, fillet, belt), a sacerdotal ornament worn on the head



1, Mitre of English Archbishops and Bishops. 2, Mitre of Bishop of Durham.

by bishops and archbishops (including the Pope), cardinals, and in some instances by abbots, upon solemn occasions, or by a Jewish high-priest. It is a sort of cap pointed and cleft at the top, this form being supposed to symbolize the 'cloven tongues' of the day of Pentecost. The Pope has four mitres, which are more or less rich according to the solemnity of the feast-days on which they are to be worn.

Mitre (Mitra), a name of many sea-snails possessing an elegant turreted shell. The shells exhibit a great variety of patterns, and are variegated with every kind of colour. They abound in the seas of hot climates.

Mittau (mit'ou), or **Mitava**, a town of Latvia, formerly in Russia, capital of the government of Courland, in a low, flat, and sandy district on the Au. Founded in 1271, the town was the residence of the Dukes of Courland during the sixteenth century. Pop. about 40,000.

Mivart, St. George, naturalist and scientist, born 1827, died 1900. He was educated at Harrow; King's College, London; and the Roman Catholic College at Oscott. Among his works are: *The Genesis of the Species* (combating the Darwinian 'natural selection'), *Man and Apes*, *Contemporary Evolution*, *The Cat*, *Nature and Thought*, *Origin of Human Reason*, and *Types of Animal Life*.

Mnemonics (nē-mon'ika), the collective term employed to designate 'memory systems' which make use of the device of connecting unfamiliar with familiar ideas as an aid to recollection. All

such systems are more or less arbitrary. The art is of remote antiquity, Simonides, the Greek poet (500 B.C.), having devised a system. See *Memory*.

Mnemosyne (né-mos'i-nē; Gr., 'Memory'), in the Greek mythology, daughter of Uranus (Heaven) and Gaia (Earth), and by Zeus the mother of the nine Muses.

Mnium, a large genus of broad-leaved mosses. *M. punctatum*, with roundish, and *M. undulatum*, with strap-shaped leaves, are abundant in moist woods and glens.

Moa, an extinct bird of New Zealand. See *Dinornis*.

Moab, the land of the Moabites, a tribe dwelling in the mountainous region east of the Dead Sea. According to the Mosiac account (*Gen. xix, 37*) the Moabites were descended from Moab, the son of Lot by his eldest daughter. In the time of the judges they were for eighteen years masters of the Hebrews, but in the time of David were rendered tributaries to them. After the Babylonish captivity they lost their separate national existence.

Moabite Stone, a monument of black basaltic granite about 3 feet 5 inches high and 1 foot 9 inches wide and thick, with rounded top but square base, on which there is an inscription of thirty-four lines in Hebrew-Phœnician characters, discovered by F. A. Klein in 1868 at Dhiban in the ancient Moab. It was unfortunately broken by the natives. The larger pieces were secured for the Louvre by Clermont-Ganneau, who had obtained a paper impression of the inscription before the stone was broken. The inscription dates about 900 B.C., and is the oldest known in the Hebrew-Phœnician form of writing. It was erected by Mesha, King of Moab, and is a record of his wars with Omri, King of Israel, and his successors.

Mobile (mo-bél'), a city and port of entry of Alabama, United States, on the Mobile, at its entrance into Mobile Bay. It has an important export trade, and next to New Orleans is one of the greatest cotton marts of the south. A channel 33 miles long is maintained by dredging to allow the approach of tolerably large vessels to the harbour; but from 1911 to 1914 large harbour improvements were made. Pop. 60,777.

Mobile, a river of the United States, in Alabama, formed by the union of the Alabama and the Tombigbee, which unite about 45 miles above the town of Mobile. It enters Mobile Bay by two mouths.

Mobile Bay, an estuary of the Gulf of Mexico, from 8 to 18 miles wide, and about 35 miles in length, north to south, the general depth being 12 to 14 feet.

Moc'asin Snake, or **Copper-head**, a very venomous serpent (*Ancistródon contortrix*) of the rattlesnake kind, frequenting swamps in many of the warmer parts of the United States. It is about a yard in length, with dark-brown or red markings above, and grey below.

Mocha (mok'a), or **Mokha**, an Arabian fortified seaport in the Yemen, on the Red Sea, formerly the chief port and emporium of trade in this region, but now little more than a heap of ruins. Pop. about 5000.

Mocha-stone. See *Moss-agate*.

Mocking-bird, an American bird of the thrush family (*Mimus polyglottus*). It is of an ashy-brown colour above, lighter below, and is much sought for on account of its wonderful



Mocking-bird (*Mimus polyglottus*)

faculty of imitating the cries or notes of almost every species of animal, as well as many noises that are produced artificially. Its own notes form a beautiful and varied strain. It inhabits North America chiefly, being a constant resident of the Southern States, and but rare and migratory in the northern parts of the continent. It is also found in the West-Indian Islands.

Mock-orange (*Philadelphus coronarius*), a large bushy shrub, ord. Saxifragaceæ, common in cottage gardens and shrubberies, and remarkable in early summer for its terminal tufts of creamy-white flowers having a powerful odour, which at a distance resembles that of orange-flowers. Also called *Syringa*.

Mod'ena (ancient Mutina), a town of North Italy, capital of the province of Modena, situated in a somewhat low but fertile plain, between the Secchia and the Panaro. The most interesting buildings are the cathedral; the campanile; the ducal, now the royal palace; and the university. The manufactures and trade are unimportant. Pop. 76,584.—*Modena* was formerly an independent duchy bordering on Tuscany,

Lucca, Bologna, Mantua, and Parma. It is now divided into the provinces of Modena (1008 sq. miles; pop. 373,000), Massa-Carrara, and Reggio. Previous to 1859 Modena was governed by a branch of the House of Este.

Moderates, a party in the Church of Scotland which arose early in the eighteenth century, and claimed the character of moderation in doctrine, discipline, and church government. It differed from the Evangelical party more particularly on the question of patronage. The difference of opinion between the two parties led to the Disruption in the Church of Scotland in 1843.

Modernism. The term modernism is sometimes applied in theology to designate the modern movement in general, which may be described as a movement towards freedom from the bonds of ecclesiastical authority. But the term is specially, and was indeed originally, applied in designation of a movement of reform within the Roman Catholic Church belonging chiefly to the last decade of the nineteenth century and the first decade of the twentieth. Among the representatives of the movement may be named: Alfred Loisy, Lucien Laberthonnière, and Édouard le Roy in France; Antonio Fogazzaro and Romolo Murri in Italy; George Tyrrell and Friedrich von Hügel in England; and Hermann Schell and Joseph Schnitzer in Germany. Modernism was in fact a complex of movements initially independent of each other, yet united in the end by a common sympathy and in a common condemnation, having been condemned together in the encyclical *Pascendi Dominici gregis* issued by Pope Pius X on 8th Sept., 1907.

Modernism, ideally regarded, has been defined by George Tyrrell (*Letters*, p. 119), perhaps the most prominent leader in the movement, as "a synthesis of Catholicism and Science". So defined, modernism may have a future before it, although so soon suppressed in the Roman Church. Of course the terms here used, Catholicism and Science, are to be widely interpreted. If Catholicism spells Roman Catholicism, or Ultramontaniam, then the attempted synthesis would be in vain, judging from the fate of the historical movement. Or again, unless Science includes in its scope historical research and philosophical reflection, then the attempted synthesis would not be so broadly based as the historical movement. For characteristic of modernism were its critical investigations of the Bible and of the history of Church and dogma, its studies in the philosophy of religion, and its use of a new philosophical apologetic, not to speak of its deep interest in ecclesiastical and social reform.—Cf. A. L. Lilley, article *Modernism* in Hastings's *Encyclopædia of Religion and Ethics*.

Mod'ica, a town of Sicily, in the province of Syracuse. It trades in grain, oil, wine, cheese, and cattle. Pop. 55,924.

Möen, a Danish island in the Baltic, between Zealand and Falster. It is very picturesque. Farming and fishing are staple industries. The capital is Stege, a seaport on the west coast. Pop. about 14,200.

Mœritherium, a small ancestor of the elephants, without tusks, and probably with no trunk, occurring in the Oligocene beds of Lower Egypt.

Moffat, Robert, Scottish missionary traveller, born 1795, died 1883. He began missionary work in South Africa in 1813, and in 1818 made a long exploratory tour in the Damara country. He received the degree of D.D. from Edinburgh University, and in 1873 he was presented with a public testimonial (£5800). One of his daughters became the wife of Dr. Livingstone.

Moffat, a watering-place of Scotland, in the county of Dumfries, situated in an amphitheatre of rounded hills in the valley of the Annan. It has mineral springs, and is much frequented by visitors in summer. Pop. 2426.

Mogador', a seaport of Morocco, about 110 miles west by south of the city of Marrakesh. It is fortified, and has a good harbour, improved greatly during 1922. The exports are wool, gum, wax, hides, skins, honey, ostrich feathers, and grain. Pop. about 24,000.

Mogul', or **Mughal**, a word which is the same as *Mongol*, but is applied particularly to the sovereigns of Mongolian origin, called Great or Grand Moguls, descendants of Tamerlane, who ruled in India from the sixteenth century downwards, the first of them being the conqueror Baber.

Mohair is the outer covering of a well-known type of animal from the Middle East, of which, perhaps, the chief centre is Angola: hence the name Angora goat. The staple of mohair is pure white, soft, and long, and, being comparatively straight (the typical physical feature of hair), is exceedingly lustrous. It is used extensively in the manufacture of yarns for dress mantles and other garments for ladies, constitutes the pile yarn for several types of plush fabrics, and is also utilized in the manufacture of braid of various kinds for the ornamentation of dresses, hats, and the like. Artificial silk yarns now enter largely into competition with mohair and similar fibres for this trade.

Mo'hawks, a tribe of North American Indians, belonging to the confederacy of the Five (afterwards Six) Nations. They originally inhabited the valley of the Mohawk River. With the rest of the confederacy they adhered to the British interest during the War of the Revolution, and left the country on its termina-

tion for Canada, where lands were assigned them on the Grand River. Their language has been committed to writing.

Mohic'ans, or more correctly **Mahicans**, a tribe of Indians formerly occupying the country now forming the south-western parts of New England and that portion of New York state east of the Hudson. The Mohegans are an allied tribe.

Mo'hilev, a town in Russia, capital of a government of the same name, on both banks of the Dnieper, 212 miles w.s.w. of Moscow. It has spacious streets and a large octagonal square occupied by the principal buildings, among others the palace of the Greek archbishop and the bazaar. The staple manufacture is tobacco; and before the European War the trade with Riga, Memel, Dantzig, and Odessa, chiefly in leather, wax, honey, potash, oil, and grain, was very extensive. Pop. 54,000.—The government has an area of about 18,500 sq. miles. Pop. 1,700,000.—There is another *Mohilev* in the government of Podolsk, on the left bank of the Dniester, 60 miles e.s.e. of Kamenetz, with a pop. of 18,129.

Mohurram. See *Muharram*.

Moldore (from the Portuguese, *moeda d'ouro*, literally, coin of gold), a gold coin formerly used in Portugal (from 1690-1722), of the value of 4800 reis, or £1, 7s. sterling.

Moiré, (*mwa'ra*), the French name given to silks figured by a process called 'watering'. The silks for this purpose are of a substantial structure, and are first damped and folded lengthwise if wide fabrics, or two narrow pieces are placed face to face. They are then subjected to a very high pressure, and the air in trying to escape drives the small quantity of moisture before it, and, in addition, the pressure between the various parts of the face-to-face cloths varies because of the relative positions of the two; this joint action results in some parts being crushed or flattened more than others, and hence the permanent water-marks which appear in wavy lines. The finest kinds of watered silks are known as *moirés antiques*. A very similar appearance is often obtained on linen fabrics by damping and beetling. An open-net fabric placed on a more compact fabric yields the same effect without any special finishing operation. *Moiré* is similar to *moiré* or *moreen*, but made from dyed yarns instead of being piece-dyed.

Mokanna (*Al-Mokanna*, 'the veiled'), the assumed name of Hashim-Ibn-Hakim, a fuller of Ghaz, in the district of Merv, who proclaimed his divine mission as a prophet, headed a revolt in Khorasan against Caliph Mahdi, and held out for five years (until A.D. 779), when he poisoned and burned his family, and then burned himself. His followers continued to pay him divine honours after his demise.

Mola-di-Bari (ancient *Turres Julianæ*), a seaport of Italy, on the Adriatic, in the province of Bari. Cattle, cereals, oil, and wine are exported. Pop. 14,000.

Molasses, the uncrystallized syrup produced in the manufacture of sugar. It differs from treacle, as molasses comes from sugar in the process of making, treacle in the process of refining. Rum is a fermented product of molasses.

Mold, county town of Flintshire, North Wales, served by the London & North-Western Railway. There are collieries, lead-mines, mineral-oil works, limestone-quarries, and potteries in the neighbourhood. Pop. 4659.

Mole, a name given to small insectivorous mammals, mostly belonging to the family *Talpidae*, which, in search of worms or insect larvæ, form burrows just under the surface of



Common Mole (*Talpa europæa*)

Section of Mole-hill below.

the ground, throwing up the excavated soil into ridges and hillocks. The common mole (*Talpa europæa*) is found all over Europe, except Ireland, and the extreme south and north; and ranges through Asia north of the Himalaya to Japan. It is from 5 to 6 inches long; its head is large, without any external ears; and its eyes

are very minute, and concealed by its fur, which is short and soft. Its fore-legs are very short and strong, and its snout slender, strong, and tendinous. It is the only British representative of the family. The 'star-nosed moles' of North America (*Condylura*) are so named from a star-shaped appendage on the snout. The web-footed moles (*Scalops*) are also North American. The golden moles (*Chrysochloris*), native to Africa south of the equator, and representing a distinct family, are remarkable for the metallic appearance of their fur, due to the presence of iridescent hairs. The pouched mole (*Notoryctes typhlops*), native to the deserts of South Australia, constitutes a distinct family of the Marsupialia.

Mole. See *Jetty*.

Mole-cricket, a name given to certain orthopterous insects from the peculiar similarity of the anterior extremities of the species, and from the resemblance in their habits, to those of the mole. The best-known species (*Gryllotalpa vulgaris*), not uncommon in England, is about $1\frac{1}{2}$ inches long and of a brown colour. In making its burrows it cuts through the roots of plants and commits great devastation in gardens.

Molecular Weights. The distinction between a *molecule* and an *atom* has been explained under *Chemistry* (see also *Matter*). The molecular weight of any elementary or compound substance is a number expressing, in terms of a chosen unit, the sum of the weights of the atoms which make up the molecule of the substance. Atomic and molecular weights were formerly expressed in terms of the weight of an atom of hydrogen as the unit (H = 1); the unit now almost universally used is defined to be one-sixteenth of the weight of an atom of oxygen (O = 16, H = 1.008). According to Avogadro's Law, the molecular weight of a substance in the gaseous state is proportional to its density. See *Gases*, *Properties of*.

Mole-rat, a name given to rodents of the genus *Spalax*, family Spalacidae. They are dumpy, stout-bodied rodents, with short, strong limbs, a short tail or scarcely any, and minute or rudimentary eyes and ears. They make tunnels and throw up hillocks like the mole, but their food appears to consist wholly of vegetable substances. All the species belong to the Old World, *S. typhlus* inhabiting the south of Russia, some parts of Asia, and Egypt.

Moleskin, a strong, twilled, cotton fabric of the fustian type of weave, cropped or shorn before dyeing. In reality it is a cloth of the type known as velveteen, but uncut instead of cut, in which there may be from 200 to 400 wett threads per inch. It receives its name from being soft and having a resemblance to the skin of the mole, and the cloth is much used for workmen's clothing.

Molfetta, an Italian seaport on the Adriatic, in the province of Bari. The church of S. Corato at Molfetta was formerly a cathedral. There are manufactures of linen and saltpetre, and a good trade. Pop. 42,000.

Molière (molyâr), the *nom de théâtre* of Jean Baptiste Poquelin, the greatest of French writers, and the greatest of modern dramatists after Shakespeare. Almost every fact and date in Molière's life is the subject of a more or less acrimonious controversy; many of even the minutest details have called forth elaborate monographs. The short sketch of his life here given follows the majority of competent authorities. Molière was born in Paris, and was baptized on 15th Jan., 1622. His father was an upholsterer, who became valet *tapisier* to the king, a lucrative position of some importance. He was educated at the Jesuit Collège de Clermont, which he left in 1641. He became a pupil of Gassendi, and made a complete translation (not preserved) of the *De Rerum Natura* of Lucretius. It is probable that he was called to the Bar. In 1643 he hired a tennis-court, and began therein his career as an actor, along with various members of the Béjart family. They took the name of L'illustre Théâtre. After three years of varying success in Paris, they were obliged to tour the provinces from 1646 to 1658, when they were able to return in triumph to the scene of their former failure. While travelling in the provinces Molière got practice in writing for the stage; two of his early farces, *La Jalouse de Barbouille* and *Le Médecin volant*, have been preserved. Some of his more elaborate pieces existed in whole or in part before he returned to Paris, but his career as dramatist may practically be said to commence with *Les Précieuses ridicules* (1659); it ended with his death in 1673. During these fourteen busy years Molière was not merely a playwright, he was also principal actor and stage-manager. Some time early in 1662 Molière married Armande Béjart, an actress in his own company, probably about twenty years his junior, and a sister of his friend Madeleine Béjart. The marriage was not a happy one, and caused much scandal at the time, scandal which was originally spread abroad by Molière's enemies, but which has since been propagated by many of his admirers and biographers, mainly his own countrymen. There are three degrees of scandal about Molière's marriage: the positive says that Madeleine had been Molière's mistress in her younger days; the comparative says that Armande was not the sister but the daughter of Madeleine; and the superlative says that Molière was the father of his own wife. This crowning scandal, which was the impudent invention of Molière's rival Montfleury, has supplied several learned gentle-

men with material for a dissertation. There is no proper evidence of the truth of any of these calumnies. It is certain that Molière was a jealous husband; it is probable that Armande was a flighty, if not an unfaithful wife. These two things would not be worth recording were it not that so many lies about Molière's married life are solemnly set down as facts. In 1665 the king adopted Molière's troupe as his own servants. In 1667 Molière showed symptoms of lung disease, which placed him in the hands of the physicians whom he ridiculed and mistrusted. On 17th Feb., 1673, after acting the principal part in *Le Malade imaginaire*, Molière, a genuine sick man, burst a blood-vessel while coughing, and died soon after. Molière's plays are as follows: *L'Étourdi* (1655), *Le Dépit amoureux* (1658), *Les Précieuses ridicules* (1659), *Sganarelle* (1660), *Don Garcie de Navarre* (1661), *L'École des maris* (1662), *Les Fâcheux* (1662), *L'École des femmes* (1662), *La Critique de l'école des femmes* (1663), *Impromptu de Versailles* (1663), *Le Mariage forcé* (1664), *La Princesse d'Élide* (1664), *Le Festin de Pierre* (*Don Juan*) (1665), *L'Amour médecin* (1665), *Le Misanthrope* (1666), *Le Médecin malgré lui* (1666), *Mélicerte* (1666), *Le Sicilien* (1666), *Amphitryon* (1668), *George Dandin* (1668), *L'Avare* (1668), *Tartuffe* (1669; the first three acts were performed in 1664, and the whole play was performed in 1667, but stopped after the first night), *Monsieur de Pourceaugnac* (1669), *Les Amants magnifiques* (1671), *Le Bourgeois gentilhomme* (1671), *Les Fourberies de Scapin* (1671), *La Comtesse d'Escarbagnas* (1672), *Les Femmes savantes* (1672), *Le Malade imaginaire* (1673). All of Molière's plays, even the most hastily composed of his farces, contain passages of characteristic brilliancy; some stand out as masterpieces unequalled and unapproached. The early *Précieuses ridicules* and *Les Femmes savantes*, dealing with the affectation of learning by the ignorant, are excellent, the maturer play being, as is natural, the more effective. *Don Juan* is a masterpiece of another kind, a play which is terrible and romantic as well as comic. *George Dandin*, a farce based on a story at least as old as Boetaccio, is raised to the dignity of a satiric comedy by the De Sotenville. Another excellent farce is *Le Médecin malgré lui*, which is founded on an old fabliau. Even better is *Le Bourgeois gentilhomme*, which deals with the social aspirations of the newly enriched, and *Monsieur de Pourceaugnac*, which describes some of the difficulties of a provincial lawyer in the capital. *L'Avare* and *Amphitryon* are both founded upon Plautus, and are wholly admirable. *Tartuffe* stands even higher than any of the plays hitherto mentioned, and is a masterly exposure of hypocrisy. It raised a storm of criticism,

and was not produced in full until five years had elapsed since its composition. When its hostile reception was contrasted by the king with the favourable reception of a worthless farce *Scaramouche*, it was wittily said that "Scaramouche only ridicules God and religion, about which these people care nothing, while Molière's piece ridicules themselves". *Le Misanthrope* has been acclaimed by many as the greatest of all the plays; certainly it is that which contains most of the quintessence of the comic spirit of Molière. This play has little action, but is one of the most delicate satires ever penned. Its original sub-title was *L'Atrabilaire amoureux*, a fine description of its leading character. Like all great comic writers, Molière has a vein of seriousness in him. His muse is not only eminently witty but extraordinarily wise. His plays are a corrective to much of the humbug of modern life. He teaches many lessons, not obtrusively as, for example, Ben Jonson does, but by means of stimulating thoughtful laughter, a sense of humour, and its companion quality, a sense of proportion. He stands among the greatest of comic writers beside Aristophanes and Shakespeare, and in France he occupies a similar position to that held by the latter in England.—BIBLIOGRAPHY: A. A. Tilley, *Molière*; E. Faguet, *En lisant Molière*; E. Rigal, *Molière*; F. Soulié, *Recherches sur Molière et sur sa famille*; P. Lacroix, *Bibliographie moliéresque*.

Moll'na, Luis, a Jesuit and professor of theology at the Portuguese University of Evora, was born at Cuenca, in New Castile, in 1535, and died in 1601 at Madrid. He has become known by his theory of grace. In order to reconcile man's free-will with the Augustinian doctrine of grace, he published a work in which he undertook to reconcile the free-will of man with the foreknowledge of God and predestination. It caused lengthened discussion, and passed subsequently into the Jansenist controversy. Molina was attacked by Pascal in the *Provincial Letters*.

Moline (mo-lén'), a manufacturing city of Illinois, United States, on the Mississippi, served by the Chicago, Milwaukee and St. Paul, and other railways, and by the Hennepin canal. Pop. 30,709.

Moll'nos, Miguel, a Spanish mystic and theologian, born 1628, died 1696. In 1675 he published the *Spiritual Guide*, an ascetical treatise, which promulgated the new religious doctrine known as *Quietism*. In 1685 he was cited before the Holy Office, and in 1687 the Inquisition condemned his works. He spent the rest of his days as a prisoner in a convent of the Dominicans.

Mollasse, a soft greenish or yellowish sand-

stone series which occupies the country between the Alps and the Jura, and is of Oligocene and Miocene age.

Mollendo, a seaport and railway terminal station of Southern Peru, capital of the province of Islay, in the department of Arequipa. It is situated between the valleys of Tambo and Camara and the rivers bearing these names, and stands on the top of cliffs, the surroundings being barren, sandy, and rocky. Mollendo has no manufactures, and is, like Liverpool in Great Britain, entirely devoted to transport. Imports are mainly earthenware, cottons, machinery, iron and steel, automobiles, and food-stuffs, part of which are in transit for Bolivia. Wool, hides and skins, quinine, coca leaves, tin, copper, and antimony are exported for Bolivia; Peruvian exports comprise merino and sheep's wool, alpaca and vicuña wool, gold, silver, copper, lead and antimony ores, a little rubber, and some sugar and cocoa. Prior to 1873, when it was made the starting-point of the Southern Railway, Mollendo was merely a fishing-village. Shipping work is carried on by lighters, ships anchoring in the open roadstead about 1 mile off-shore. Mollendo is an oil-fuel depot.

Mollus'ca, a phylum of animals including such common shell-fish as snails and slugs; oysters,

The blood which is purified by these passes into a heart situated near the upper or dorsal side of the body, and is thence pumped to the various organs. A muscular thickening, or *foot*, developed on the under or ventral side of the body, is the organ of locomotion, as may be seen in a crawling snail. The central nervous system consists of a nerve-ring surrounding the front end of the digestive tube, and thickened into swellings known as ganglia.

Most molluscs possess a distinct head, bearing tentacles and eyes; and a curious rasping organ (*odontophore*), consisting of a projection on the floor of the mouth, over which is stretched from front to back a horny tooth-studded ribbon, the *radula*, often miscalled 'palate' or 'tongue'. The body is generally protected by a hard calcareous shell, which may be in one piece (*univalve*), two pieces (*bivalve*), or, more rarely, several pieces (*multivalve*). Sometimes the shell is internal.

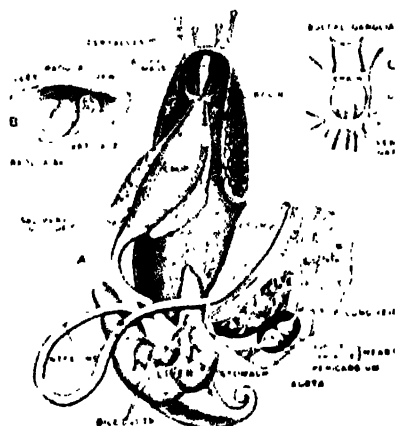
Five classes are recognized: (1) Cephalopoda (q.v.), head-footed molluscs, all marine. (2) Gasteropoda (q.v.), snails and slugs. (3) Lamellibranchia (q.v.) or Pelecypoda, bivalve molluscs. (4) Scaphopoda, tusk-shells. Small marine forms with reduced head and a curved tubular shell open at both ends. (5) Amphineura, primitive molluscs. — BIBLIOGRAPHY: Sir E. Ray Lankester, *Treatise on Zoology* (Part v, by P. Pecheuer); A. H. Cooke, *Molluscs* (*Cambridge Natural History*); Forbes and Hanley, *British Mollusca*; M. S. Lovell, *Edible Molluscs of Great Britain and Ireland*; Woodward and Tate, *Manual of the Mollusca*; Zittel and Eastman, *Text-book of Palaeontology*.

Mollwitz, a village of Silesia. Frederick the Great seized Austria from Maria Theresa, and the Austrians marched against him in 1741. On 10th April, 1741, a battle was fought near Mollwitz.

Molly Maguires, the name assumed by members of a secret illegal association in Ireland, afterwards reorganized in the anthracite coal-mining district of Pennsylvania. The organization was guilty of many outrages, and was broken up in 1876, twenty members being hanged for murder.

Moloch (*Molech*, or *Molach*, lord, or king), the chief god of the Phœnicians, frequently mentioned in Scripture as the god of the Ammonites, whose worship consisted chiefly of human sacrifices, oracles by fire, mutilation, &c. These sacrifices were offered chiefly in the valley of Hinnom, to the east of Jerusalem. King Solomon built a temple to Moloch on the Mount of Olives.

Moloch Lizard (*Moloch horridus*), a species of lizard found in the arid parts of South and West Australia. It is one of the most ferocious-looking,



Structure of Garden Snail (*Helix aspersa*)

A, General dissection, from upper side; roof of lung spread out to right. B, Buccal mass, right half removed. C, Nerve-ring, from back.

cockles, and other bivalves; and the soft-bodied cuttle-fishes and octopuses, to which the name (Lat. *mollis*, soft) was originally applied. Molluscs are unsegmented, i.e. the body is not divided into successive rings or segments, and in most cases the body-wall is drawn out into a sort of flap, the *mantle*, that helps to bound a cavity sheltering the breathing organs, which in aquatic types are usually plume-like gills.

though at the same time one of the most harmless of reptiles, the horns on the head and the numerous spines on the body giving it a most formidable and exceedingly repulsive appearance.

Molokai, an island of the Hawaiian group. It is noted for its settlement of lepers, all persons on the islands found to be affected with the disease being sent by Government to Molokai, and kept entirely isolated from the healthy part of the community. Pop. 2581.

Moltke (molt'ke), Helmuth Carl Bernhard, Count von, German field-marshal, born near Mecklenburg 1800, died 1891. He entered the Danish army in 1819; left that service for the Prussian in 1822, and became a staff-officer in 1832. In 1835 he superintended the Turkish military reforms, and he was present during the Syrian campaign against Mehemet Ali in 1839. He returned to Prussia and became colonel of the staff in 1851, and equerry to the Crown Prince in 1855. In 1858, as provisional director of the general staff, he acted in unison with von Roon and Bismarck in the vast plans of military reorganization soon after carried out. The conduct of the Danish War (1864) was attributable to his strategy, as was also the success of the Austro-Prussian War of 1866, and the Franco-Prussian War of 1870-1. In the latter year he was made field-marshal, and became count in 1872. He retired from the position of chief of the general staff in 1888. - Cf. W. Bigge, *Feldmarschall Graf Moltke*.

Molucca Archipelago, or **Spice Islands**, an island-group forming part of the Dutch East Indies. It is divided into the provinces of Ambon (13,118 sq. miles), Ternate (1063 sq. miles), and New Guinea (121,339 sq. miles, created a province in 1920). The total population is estimated at over 300,000. The Moluccas were discovered by Serrano and D'Abren in 1512, and were in Portuguese possession from 1521. Dutch possession dates from 1613, since when the islands have twice been temporarily occupied by Great Britain.

Molybdenite, mineral molybdenum sulphide, occurring as steel-grey platy six-sided crystals, commonly in granitic rocks. It is the source of molybdenum, for use in the production of hard steel.

Molybdenum, one of the less well-known metals, of a white silvery colour, harder than topaz, and having a specific gravity of 8.6 to 9.0; atomic weight, 96. It is unaltered in the air at ordinary temperatures, but is oxidized when heated. By special means it can be sintered into rods which may be drawn into wire. It is largely used in the manufacture of special steels.

Momba'sa, chief port of Kenya Colony, East Africa, on a fertile coral island off the east coast

of Africa, in lat. 4° 4' s. It has two harbours, one on the Kilindini side, and another on the north-east (see *Kenya Colony*). A short railway connects it with the mainland, and it is a terminal station of the Uganda Railway. The chief exports are ivory, grain, rubber, copra, and hides; and among the imports are piece-goods, provisions, rice, grain, building materials, and hardware. Pop. 30,000.

Moment of Inertia. See *Inertia*, *Moment of*. **Mommsen**, Theodor, German scholar and historian, born 1817, died 1903. He was appointed professor of jurisprudence at Leipzig in 1848, professor of Roman law at Zürich in 1852; obtained a similar chair at Breslau in 1854; in 1858 went to Berlin as professor of ancient history. His best-known work is a *History of Rome*, which has been translated into English; but he also published many other works on Roman history, law, and antiquities. He also edited the great *Corpus Inscriptionum Latinarum*.

Mompox', a town of Colombia, on the Magdalena. Founded in 1538, it was at one time of considerable commercial importance, but the capricious changes of the river's course have seriously injured its prosperity. Pop. 9000.

Momus, the god of mockery and censure among the ancients, was the son of Night. Aphrodite herself was exposed to his satire; and when he could find no fault with her person, he observed that the noise of her footfalls was too loud for the goddess of beauty. He was expelled from heaven for his free criticism of the gods. Momus is generally represented raising a mask from his face and holding a small figure in his hand.

Mona, the ancient name of the Isle of Anglesey. The Isle of Man is also referred to as Mona, principally by Caesar, but it is called *Monapia* by Pliny, and *Monarina* or *Monacæda* by Ptolemy.

Mona (*Cercopithecus mona*), a West African monkey, sometimes called the *variegated monkey*, because its fur is varied with grey, red, brown, and green. It is frequently brought to Europe and is easily tamed.

Monaco, a principality on the Mediterranean, surrounded since 1800 by the French department of Alpes-Maritimes, except on the side facing the sea. The capital is Monaco (pop. 2247), a sea-bathing resort and the seat of an international hydrographic bureau established in 1921. Below La Condamine (pop. 11,082), and a mile to the east, is Monte Carlo (pop. 9627), a collection of hotels and villas, with a casino established in 1860. Commerce is relatively unimportant, coal and wine being imported; olive oil, oranges, perfumes, and citrons are exported. The revenue is mainly derived

from the gaming-tables, the concession for which brought in £80,000 (1917), and will provide £90,000 in 1927, and £100,000 in 1937. Area, 8 sq. miles; pop. about 23,000.

Monaco belonged to the Grimaldi family from A.D. 908. The reigning prince was dispossessed in 1792 (French Revolution). The principality was not re-established until 1814, being then placed under the protection of the Kingdom of Sardinia (Treaty of Vienna, 1815). Mentone and Rocabruno revolted in 1848, and were ceded to France in 1861. Until 7th Jan., 1911, the prince was absolute, but a Constitution granted on that date provides for a National Council elected by universal suffrage and *scrutin de liste*. The territory is divided into three communes. The coinage of the principality (100 franc pieces) has been current (since 1876) in all states of the Latin Union. There are special postage stamps and a national flag. Since 1887 there has been a Roman Catholic bishop. —C. A. Smith, *Monaco and Monte Carlo*.

Monad (Gr. *monas*, unit). In philosophy, an imaginary entity in the philosophy of Leibnitz, according to whom monads are simple substances, of which the whole universe is composed, each differing from every other, but all agreeing in having no extension, but in being possessed of life, the source of all motion and activity. Every monad, according to Leibnitz, is a soul, and a human soul is only a monad of elevated rank.

Monad, a name formerly applied to extremely minute unicellular animals (Protozoa) common in putrefying liquids, and swimming by the undulations of one or more slender protoplasmic filaments (*flagella*).

Monaghan, a county of Ireland; area, 500 sq. miles. The surface is hilly, and abounds with small lakes and bogs. Flax, oats, and potatoes are produced, but linen manufacturing forms the chief employment. Monaghan is the county town. Pop. 72,000. The town of *Monaghan* is 70 miles N.W. of Dublin, on the Ulster Canal. It is an old place, and had a charter from James I. Pop. 4500.

Monarchy (Gr. *monarchia*, sole power), is a state or government in which the supreme power is either actually or nominally vested for life in a single person, by whatsoever name he may be distinguished. A monarchy in which the subjects have no right or powers as against the monarch is termed *despotic* or *absolute*; when the legislative power is wholly in the hands of a monarch, who, however, is himself subject to the law, it is termed *autocratic*; but when the monarch shares the power of enacting laws with representatives of the people, the monarchy is *limited* or *constitutional*. In ancient Greece a monarchy in which the ruler either obtained or

administered his power in violation of the Constitution was termed a *tyranny*, however beneficent and mild the rule might be. Monarchies are either *hereditary* or *elective*.

Monasticism. The monastic system in Western Europe dates from the time of St. Benedict (about 480 to 544), but the impulse towards a life of religious seclusion is much older and goes back to pre-Christian times, where it is found in India as well as in Judea and in Egypt. Christian monasticism is generally regarded as having originated with St. Anthony (born in Egypt about 250), who lived as a hermit and attracted other hermits to the neighbourhood of his cell. His followers were not organized into a community or Order, and the first monastic Order, governed by a strict and detailed rule of life, was that of St. Pachomius (292-346), who also lived in Egypt. From Egypt both forms of monastic life spread into Syria (where the exaggeration of the eremitic form is illustrated by St. Simeon Stylites, who lived for thirty years on the top of a pillar from which he never descended), into Asia Minor, and into Western Europe. The eremitic life, with its extreme austerities, attracted votaries in Western Europe from the middle of the fourth century, but lack of organization prevented it from exercising any widespread influence. The creator of the historical European monasticism was St. Benedict of Nursia (in Umbria), who established the cenobitic or community life, and devised a Rule which was the model of subsequent founders. The Rule of St. Benedict was distinguished by its abandonment of the austerities which had been introduced from the East, and by its adaptation of the monastic ideal to the climate and circumstances of Italy, and it was less severe than the slightly later Irish Rule of St. Columbanus, which had for a time some vogue on the Continent. The Benedictines or Black monks (so called from their official habit) were to live in separate communities, each under the government of its abbot, who, however, was bound to consult the whole community when important questions arose for settlement. Their day was divided between religious services, reading, and work. The work done might be of almost any nature—manual and agricultural, literary, educational—and the monks played a great part in the evangelization of Northern Europe, in the introduction of the arts and of civilization, and in the preservation and extension of learning. They came to be known as 'regulars' because they lived under a 'regula' or Rule, and were thus distinguished from the 'secular' clergy, who lived in the world. They were also known as 'religious', and so to enter religion meant, in the Middle Ages, to become a member of

a monastery. Monks were 'clerks' in the wide sense of the term, and had the legal privileges of the clergy, but it was not contemplated that they should all receive holy orders.

Degeneration from the Benedictine ideal led to successive reforms or revivals, the most famous of which was the Clunian Order, founded at the Abbey of Cluny, in Burgundy (910). This offshoot of the Benedictines exercised a profound influence upon the Church and the Papacy in the tenth and eleventh centuries. Other independent offshoots from the Benedictines subsequently arose, the most important of which was the Cistercians (the Grey or White monks), founded in the end of the eleventh century by St. Robert at Cîteaux, near Dijon. The greatness of the new Order, which aimed at restoring the Rule of St. Benedict in its entirety, followed the accession of St. Bernard, who in 1115 became abbot of the daughter House of Clairvaux. The Cistercians laid great stress upon manual labour; they became expert farmers, and the English Cistercians contributed much to the English wool trade in the Middle Ages. The example of Cluny led to modifications among the Benedictines proper, and they imitated the Clunians in adopting an organization to form a bond of union among the separate monasteries in each ecclesiastical province.

Other Rules grew up from about the middle of the tenth century, the followers of which, though 'regulars' or 'religious', were not, strictly speaking, monks, that is, the sole aim of the Order was not simply to live a religious life within a monastery which was, normally, their permanent home. The Canons Regular, or Austin Canons, founded in the latter part of the eleventh century, lived under what is known as the Rule of St. Augustine. They formed communities and took vows of poverty, obedience, and chastity, as the monks did, but they undertook the cure of souls and were responsible for parochial work. The Austin Canons gave rise, in turn, to the Premonstratensians, whose Rule was more austere than that of the parent body, and, in England, to the Gilbertines, a Double Order, in which the men were Austin Canons, and the women followed the Cistercian Rule. The two communities lived in adjoining buildings, and the canons performed spiritual offices for the nuns. A much greater departure from the monastic ideal came with the establishment of the Mendicant Orders or Friars—Grey Friars (1210), Dominicans (1215), and Carmelites or White Friars (1255). The friars were sharply distinguished from the monks by belonging not to any particular house and having no permanent homes. Unlike the monks, they did not, at first, reside in large, great buildings, and their

obedience was due not to the head of an individual House, but to the Order itself or to the authorities of their own province. Their ideal was not contemplative nor connected with the performance of manual labour, and they wandered about the country, begging for their subsistence and paying special attention to the poor, and assisting the regular clergy. The care of the poor and sick was the special duty of the Franciscans, and the Dominicans were distinguished by their zeal for preaching. Both Orders made important contributions to learning. All these Orders, both of monks and friars, were cenobitic. The most important foundation suggestive of eremitic monasticism was that of the Carthusians, founded by St. Bruno at Chartreuse, near Grenoble, in 1084. Their Rule was very austere, and though they lived in a Charterhouse, most of their time was passed in separate hermitages. The number of Charterhouses was small, but there were several in England, and one in Scotland—at Perth, founded by James I. Most of the great Orders, including the Benedictines, the Franciscans, and the Dominicans, had branches for women, and separate Orders of nuns, like the Brigittines and the Ursulines, were founded.

By the period of the Reformation, the religious Orders had degenerated all over Europe, and that event led to their disappearance from Protestant countries. During the Counter-Reformation, some new Orders were founded—the Society of Jesus (1540) being the most important—and there was a new development in the creation of communities of secular priests bound by temporary vows—the Oratorians (1570) and the Oblates of St. Charles (1578).

Monachism, however, as belonging to the older system of things, was regarded with hostility by the spirit of rationalism and liberalism which found decisive expression in the French Revolution; and during the eighteenth century the monastic Orders were obliged, as the Papal power diminished, to submit to many restrictions imposed upon them by Catholic princes, or to purchase immunity at a high price. In 1781 the houses of some Orders were wholly abolished by the Emperor Joseph II. In France the abolition of all Orders and monasteries was decreed in 1789, and the example was followed by all the states incorporated with France under the protection of Napoleon I. In the nineteenth century, under Napoleon III and in the early years of the Republic, monachism prospered in France; but restrictions were later imposed, and since 1901 many monasteries have been dissolved. In Germany all Orders except those engaged in tending the sick were abolished in 1875. The unification of Italy was followed by a series of decrees pronouncing all monastic Orders illegal.

and partly in standard money (see later). An issue of notes against securities or without a reserve is called *fiduciary*. Besides acting as a medium of exchange, money serves as a measure of value, thereby enabling values to be compared; as a standard for measuring deferred payments, such as debts; and as a store of value. An important distinction is between standard money and token money. The former is composed of the standard of value, i.e. any commodity with which other things are compared to measure their value. Before the European War gold was (and nominally still is) the standard of value in all European countries and their colonies, and in America. In the United Kingdom this was embodied in the sovereign and half-sovereign, in the Latin Monetary Union (which includes France, Belgium, Italy, Switzerland, and Greece) in the gold napoleon. Since the European War the sovereign and similar coins have ceased to be true standard money, since their value as metal is now greater than their value as coins. The value of standard money depends on the value of the material in it; but token money, as in the case of notes, derives its value from law or custom, without regard to its intrinsic value. A country's money may consist entirely of token money, no standard money being in circulation. In India there is virtually a gold standard, but there is practically no gold in circulation. When money whose value depends on its material is in circulation, the famous *Gresham's Law*, "that bad money drives out good", may operate. The tendency is for the better coins to be melted down, hoarded, or exported, while light-weight coins remain in circulation. *Money of Account*, in which accounts are kept and prices expressed, may differ from the coins actually in use. Such money is the guinea and pound sterling in the United Kingdom, the franc in France, the mark in Germany. Another distinction is between *legal tender*, which creditors are bound by law to receive in payment of a debt, and other money. In the United Kingdom the sovereign is legal tender to any amount; while certain early issues of Treasury notes are no longer legal tender. It is important clearly to understand that money is strictly one among many commodities, just as the value of other goods is expressed in terms of money and known as their *price*. The value of money may be expressed in terms of anything else. This value is determined by the demand for and the supply of money. If there is a large supply of money relative to the amount required (which depends on the number of transactions involving money), the value of money in terms of other goods falls, and prices rise; while if the supply of money is small relative to the demand for it falls off,

the converse is the case. This conception of money explains why token money has a value though its material contents are comparatively worthless; and why the famous *assignats* issued by the French Republic (1789-94), and the rouble notes recently issued in Russia, fell to a nominal value because of an enormous over-issue. Similarly, the great discoveries of gold during the nineteenth century, by diminishing the value of gold, caused a large rise of prices in gold-standard countries. In consequence of this, *bimetallists* proposed to use as a standard both gold and silver, which for currency purposes were to be made interchangeable at a fixed rate. A proposal of more practical interest to-day is to use an index number (q.v.) to show how money contracts must be varied so as to make the purchasing power of money constant. Cheques, bills of exchange, and similar credit instruments are sometimes regarded as money; but though they form a most important part of the mechanism of exchange, they lack the characteristic of circulating readily from hand to hand. They really only transfer the right to money, and so economize and dispense with the use of money itself. Thus, an extension or restriction of their use, if no other change takes place, has the same effect as an increase or decrease in the supply of money. When the supply of money, from whatever cause, is greater than is required, *inflation* takes place. To this, as a result of credit expansion and excessive note issue, is largely due the rise of prices during and after the European War. See *Credit*. — **BIBLIOGRAPHY:** W. S. Jevons, *Money and the Mechanism of Exchange*; G. Clare, *Money Market Primer*; Harley Withers, *Meaning of Money*; W. T. Layton, *Introduction to the Study of Prices*; R. G. Hawtry, *Theory of Money*; H. S. Foxwell, *Papers on Current Finance*.

Money-lenders Act, an Act (63 and 64 Vict., c. 51) passed in Aug., 1900, coming into force on 1st Nov. of the same year. Its main purpose is to prevent the extortion of excessive interest by money-lenders, the Act giving courts power to alter money-lending agreements where there is sufficient reason for so doing. The expression 'money-lender' does not include pawnbrokers, friendly societies, building societies, bankers, and certain other specified persons or institutions. Money-lenders within the meaning of the Act must register themselves in accordance with its provisions, and must not trade under any other name than that by which they are registered or at other than the registered address, and if any money-lender fails to register himself, or violates the conditions of registration, he is liable on conviction to a fine not exceeding £100, and in the case of a subsequent conviction to imprisonment with or without hard labour for

not more than three months, or to a fine not exceeding £100, or to both. If the offender be a body corporate, the penalty for each conviction after the first is a fine not exceeding £500. Heavy penalties are also attached to deception and fraudulent statements by money-lenders or those employed by them. A further Act was passed in 1911. By it money-lenders are prohibited from carrying on business under any name containing the word 'bank' or implying a banking business, and from issuing circulars, letters, &c., containing any expressions which might reasonably be construed as implying a banking business.

Moneywort, a plant, the *Lysimachia nummularia*, very often given the names Creeping Loosestripe and Creeping Jenny.

Monge, Gaspard, French mathematician, born 1740, died 1818. He is remembered chiefly for his invention of descriptive geometry, but his researches on the lines of curvature of surfaces and on partial differential equations are also well known to students. He took a prominent part in the foundation of the normal and polytechnic schools in Paris, and was professor of descriptive geometry in both of these. Monge was a keen supporter of Napoleon, and was deprived of all his offices and honours after Waterloo.

Monghyr, a district and town of Bihar and Orissa, India. The district lies in the valley of the Ganges, and generally yields two annual crops of tobacco, rice, and maize. Area, 3922 sq. miles; pop. 2,140,000. The town stands on the Ganges, 80 miles east of Patna. Pop. 47,000.

Mongolia, an outlying region of North-Eastern China, partly traversed by the desert of Gobi and by the Altai and Khangai Mountains. It is nominally under the sovereignty of China, and comprises two areas, viz. Inner Mongolia, bordering on China Proper and Manchuria; and Outer Mongolia, which has frontiers to Sinkiang, Siberia, and Manchuria. Urga, the chief town, is a trading-centre, exporting wool, skins, furs, hides, and horns. During the summer season it is in communication by motor-car across the Gobi desert with Kulgan (in Chihli), the trip occupying four days. This service was inaugurated in 1917. Mongolia has (since 1915) its own legal currency. The indigenous inhabitants are Kalmucks and Mongols of nomadic tendency, who range the desert with sheep, horses, and camels, but Chinese immigration has entirely altered racial characteristics in Inner Mongolia. Lamaism (Buddhist) is the prevailing religion, lamaseries being located principally at Urga. Area, about 1,367,000 sq. miles; pop. about 2,600,000.—Cf. B. Bulstrode, *A Tour in Mongolia*.

Mongols, a race of people in the north-east of Asia, whose original seat has been supposed

by some writers (but without evidence) to have been in the north of the present Mongolia, and in Siberia to the south-east of Lake Baikal. Their first great advance was due to Genghis Khan, who, in 1206, conceived the bold plan of conquering the whole earth. After the death of Genghis Khan, in 1227, his sons and grandsons pursued his conquests, subjugated all China, subverted the caliphate of Bagdad (1263), and made the Seljuk sultans of Iconium tributary. In 1287 a Mongol army invaded Russia, and devastated the country with the most horrible cruelty. The empire of the Mongols was at the summit of its power during the reigns of Maugu Khan (1252-9) and Khubilai or Kökbi Khan (1259-94), the patron of Marco Polo. At that time it extended from the Chinese Sea and from India far into the interior of Siberia, and to the frontiers of Poland. The principal seat of the *khakan* or great khan was transferred by Khubilai from Karakorum to China; the other countries were governed by subordinate khans, all of whom were descended from Genghis, and several of whom succeeded in making themselves independent. This division of the empire was the cause of the gradual decay of the power and consequence of the Mongols in the fourteenth century. The adoption of new religions (Buddhism in the east and Mahomedanism in the west) also contributed to their fall. The eastern Mongols were finally subdued by the Manchu conquerors of China. Of the western Mongols the most powerful were the Kipchaks or Golden Horde, who lived on the Volga, and the khانات founded in Bukhara, on the Oxus, by Jagatal, the eldest son of Genghis Khan. The former gradually

fell under the power of the Russians; but among the latter there appeared a second formidable warrior, Timurlenk (Tamerlane), called also Timur Beg. In 1369 he chose the city of Samarkand for the seat of his new government. The other Mongol tribes, with Persia, Central Asia, and Hindustan, were successively subjugated by him. In 1402, at Ancyra (Angora), in Asia Minor, he defeated and captured the Sultan Bajazet I. After Timur's death, in 1405, his empire barely held together until 1408, when it was again divided. Balu (Balur), a descendant of Timur, founded in India in 1399 the empire of the Great Mogul, which continued in name till 1857, though its power was lost in 1739. After the commencement of the nineteenth century the Mongols lost all importance in the history of the world, became split up into a number of separate khanates and chiefdoms, and fell under the power of the neighboring peoples. Their name still lingers in the Chihli province of Mongolia, but Mongolian tribes there and far beyond its boundaries. The 1762 treaty between us to some extent reduced them to a position to

signify a very large division of the races of men (see *Ethnology*), of which the Mongols proper were considered typical. This use of the name, which includes Tartars, Chinese, and Japanese, is to be carefully distinguished from the historical use. **BIBLIOGRAPHY:** J. Curtin, *The Mongols: a History*; H. H. Howorth, *History of the Mongols*.

Mongoose, the name of small African or Oriental carnivores of the civet family (*Viverridae*), belonging to *Herpestes* and other genera. The well-known Egyptian mongoose is *H. ichneumon*. The commonest Indian species (*H. mungo*) is easily domesticated, and is kept in many houses in India to rid them of reptiles and other vermin, as rats, mice, &c. It has been said that it neutralizes the poison of snakes, which



Mongoose (*Herpestes griseus*)

It fearlessly attacks, by eating, during its contests with them, the *Ophiophiza mungos*, or snake-root; but its immunity is really due to the extreme celerity of its movements. It is of a grey colour flecked with black, and about the size of a large rat.

Mon'ica, St., mother of St. Augustine, was born in Africa, of Christian parents, in A.D. 332. The grief of her life was the worldliness and long heresy of her great son; but she was miraculously assured by a dream of his conversion, and was informed by an aged bishop that "the child of so many tears could not be lost". With her other son, Navigius, she followed Augustine to Italy, where she died 4th May, 387, at Ostia. Her festival is 4th May.

Monilla, a genus of Fungi Imperfecti, section Hyphomycetes. *M. fructigena* causes the brown-rot of apples, plums, and other orchard fruits. The best remedies are burning of diseased fruit, and spraying of the trees with copperas or Bordeaux mixture.

Monism, a philosophical doctrine, which maintains that in the universe there is only one substance and of activity, and which holds that everything is one central and all-pervading unity.

It is opposed to dualism, which holds that matter and spirit are two distinct things. Monism was first used by Christian Wolf (1679-1754). For a long period it was used only in a negative sense.

Monkeys are a type of a family of Old-World mammals. They are the largest of the order, and the largest is the *Parvus nilo-*

ticus of the Nile and Egypt, attaining a length of 6 feet. They generally inhabit the neighbourhood of rivers and lakes, and prey upon all sorts of small animals and eggs of various kinds. Some of the species are used as food. The name is due to the erroneous belief formerly entertained that these lizards gave warning of the approach of crocodiles. It is called in Arabic, *ouaran*, meaning simply lizard, not warning lizard.

Monitor, the popular name for a class of very shallow, heavily-armed iron-clad steam-vessels, invented by Ericsson, carrying on their open decks either one or two revolving turrets, each containing one or more heavy guns, and designed to combine the maximum of gun-power with the minimum of exposure. Monitors were so called from the name of the first vessel of the kind, built by the Federals during the American Civil War, which proved its superiority in a famous engagement with the Confederate ship *Merrimac* in 1862. During the European War (1914-18) monitors were considerably developed, their light draught rendering them suitable for short-range coastal bombardments in the shallow waters of the Belgian littoral. The first monitors used in these operations were originally built for the Brazilian navy. Among others H.M.S. *General Wolfe* had an 18-inch armament; other conspicuous ships were the *Mersey*, *Humber*, *Abercrombie*, and *Severn*. The *Mersey*, with the *Severn*, assisted in the destruction of the German cruiser *Königsberg* in the Rufiji River (East Africa) during July 1915. The *Severn* was completed (1913) as the *Solimoës*, and was intended for the Amazon service of the Brazilian Government. Her displacement was 1260 tons; length, 265 feet; beam, 49 feet; armament, three 6-inch, two 4.7-inch, four 3-pounders, and six machine-guns; speed, 11½ knots. The sides were heavily 'blistered' against submarine attack.

Monk, George, Duke of Albemarle, an English general, famous for the prominent part he took in the restoration of Charles II, was born in 1608, and died in 1670. At the age of seventeen he volunteered as a private soldier in the expedition to Cadiz. In 1628 he served at the Island of Rhé, and from 1629 till 1638 in the Netherlands, where his soldierly qualities gained him a captaincy. In the struggle betwixt Charles I and the Parliament Monk at first joined the Royalists; but in Jan., 1644, he was taken prisoner at the siege of Nantwich, and after a short delay he was committed to the Tower. After the capture of the king Monk took the Covenant and regained his liberty in 1646. Under the Parliament he served in Ireland, and subsequently with Cromwell in Scotland, and in 1650 he reduced that country to obedience within a few weeks. In 1658 he assisted Admiral

Dean in inflicting two severe naval defeats on the Dutch under Van Tromp the elder. Monk had always been regarded with hope by the Royalist party, and he seems to have decided at once upon the Restoration. The coming over of Charles II was arranged with Monk, and the king rewarded his restorer with the dukedom of Albemarle, the Order of the Garter, and with a pension of £7000 a year. Monk now fell into comparative obscurity. In 1666, however, he once more served against the Dutch at sea, defeating Van Tromp the younger and De Ruyter. Cf. C. H. Firth, *Scotland and the Commonwealth*.

Monkey Puzzle, the popular name of a coniferous tree, *Araucaria imbricata*, a native of the mountains of Chile, but commonly grown in this country, where it thrives even in suburban gardens. The name refers to the prickly nature of the broad rigid leaves.

Monkeys, the popular name applied to members of the mammalian ord. Primates, ex-

by their obliquely-set nostrils, which are placed close together, the nasal septum being narrow, and face downwards. Opposable thumbs and great toes exist in nearly all. The tail may be rudimentary or wanting, but in no case is it prehensile. Check-pouches, which are used as receptacles for food preparatory to its mastication, are present in many; and the skin covering the prominences of the buttocks is frequently destitute of hair, becomes hardened, and thus constitutes the so-called *ischial callosities*. The catarrhine monkeys inhabit Asia and Africa. They include the anthropoid or man-like apes (gibbons, orang, chimpanzee, and gorilla), the baboons and mandrills, the sacred monkey of the Hindus, the proboscis monkey, the Diana monkey, the marmoset, the waderoo, &c. The lower section of monkeys consists of the *Platyrrhina* (Gr. *platys*, broad, *rhinos*, nostrils), or New-World monkeys, which are entirely confined to South America. They have the nostrils widely separated, the septum or partition between being broad, hence the name. Another peculiarity consists in their prehensile tails; and there are none of the check-pouches or hard callosities on the rump so characteristic of Old-World monkeys. The diet is especially of a vegetable nature. This section includes the marmosets, the spider-monkeys, the capuchin monkeys, the squirrel-monkeys, the howling monkeys, &c. See *Ape*, *Baboon*, &c.

Monmouth, James Stuart, Duke of, the natural son of Lucy Walters, one of the mistresses of Charles II, was born at Rotterdam in 1649, died 1685. He was always acknowledged by Charles as his natural son, though there were doubts of his paternity. After the Restoration he was created Duke of Orkney and Duke of Monmouth (1669), married the daughter and heiress of the Earl of Buccleuch, and received the Garter. He became extremely popular, especially among Protestants, who wished him rather than the Duke of York (afterwards James II) to succeed to the throne, and who started a groundless rumour that he was legitimate. In 1679 Monmouth was entrusted with a command in Scotland, and defeated the Covenanters at the battle of Burnside Bridge, 22nd June. He was soon afterwards sent beyond seas on the invitation of his uncle. A few months afterwards he met William Russell and Algernon Sidney, the popular movement in which the latter was sacrificed. The result to Monmouth was his exile in Holland. On the accession of James II he was induced to attempt to invade England. He arrived at Lyme Regis with less than a hundred followers (11th June, 1685), but his numbers were soon increased.



1, End of Tail of Spider-monkey. 2, Hand of Black Saki.
3, Thumbless Hand of Spider-monkey.

clusive of the lowest and highest types, i.e. lemurs and men. It is sometimes limited to tailed forms, to the exclusion of the apes and baboons. The hallux or great toe is opposable to the other digits of the foot, so that the feet become converted into 'hands'. The pollex or thumb may be absent, but when developed it is generally opposable to the other fingers; and the animals thus come to possess 'four hands', or are 'quadrumanous', to use an old-fashioned term. The monkeys may all be divided into a lower and a higher group. The higher is that of the *Catarrhina* (Gr. *kata*, downwards, and *rhinos*, nostrils) or Old-World monkeys. The catarrhine monkeys are distinguished

James the poisoner of the late king, and asserted the legitimacy of his own birth; but from the first there was no likelihood of his success. His small body of undisciplined troops was totally defeated at Sedgemoor, and the duke himself was captured and beheaded after abject appeals to the king for mercy.— Cf. Allan Pea, *King Monmouth*.

Monmouth (W. *Mynydd*), a municipal borough, and the county town of Monmouthshire, England, situated at the confluence of the Monnow and Wye; served by the Great Western Railway. The Monnow is spanned by an ancient stone bridge, and the Wye by a modern one. Monmouth has malleable iron and tin-plate works, and paper- and corn-mills. The castle, of which only fragments remain, was a favourite residence of John of Gaunt, and the birth-place of Henry V. Pop. (1921), 5207.

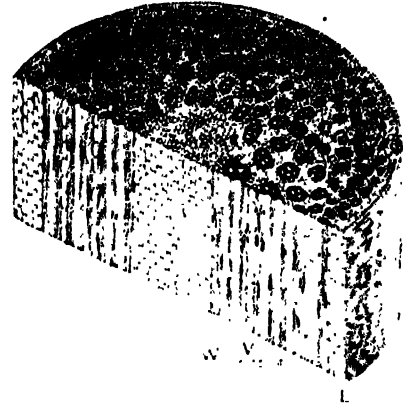
Monmouth, the county, is bounded by the counties of Hereford, Gloucester, Brecknock, and Glamorgan, and the estuary of the Severn; area, 349,552 acres. A considerable portion of the surface is mountainous and rocky, the remainder consisting of fertile valleys and gentle slopes. The chief rivers are the Wye, the Monnow, the Usk, the Ebbw, and the Rhymney. The production of coal and iron is extensive. Pontypool, Blaenavon, Tredegar, Ebbw Vale, and Rhymney are the head-quarters of the coal and iron industries. The manufacture of tin-plate is also extensively carried on. Among the antiquities of the county are remains of Llanthony and Tintern Abbeys, and the fine Norman castle of Chepstow. Monmouth returns five members to Parliament. Pop. (1921), 450,700.

Monoblepharidaceæ, a small family of saprophytic Fungi, group Oomycetes, unique among Fungi in having motile male gametes (spermatozooids). They are insignificant plants growing on dead twigs in water.

Monochord, an instrument with one string, much employed by the ancients in musical training, and for the determination of pitch. The string, stretched over a board or sounding-box, emits a musical note on being caused to vibrate. The pitch of the note varies in a definite way with the length of the vibrating portion of the string (see *Harmonics*); this length may be varied at will by means of a movable bridge. The instrument is still used by lecturers on acoustics. See *Sonometer*.

Monocotyledonous Plants, monocotyledons, one of the two main classes of Angiosperms are subdivided. As the cotyledons in the embryo of a single cotyledon, they are placed directly opposite to the plumule being lateral in origin. In dicotyledons (q.v.) are

the scattered arrangement of the vascular bundles in the stem, the absence of a cambium, the parallel-veined leaves, and the number of the floral parts, which are usually in threes or multiples of three. As a rule the leaves are large in relation to the axis (e.g. palms, aroids, banana), and arborescent types are rare, except among palms. A great number of monocotyledons are bulbous plants, or pro-



Diagrammatic Section of a Monocotyledonous Stem

The black patches in the cross-section are the scattered vascular bundles; the white circles in these are the pitted vessels. L, Epidermis. V, Pitted vessels. W, Fibres.

vided with rhizomes, corms, &c. (geophytes); the grass-type prevails in a number of families (Gramineæ, Cyperaceæ, &c.).

Monodelphia, one of the three sub-classes into which mammals were divided by de Blainville in 1816 in accordance with the nature of their female reproductive organs, the other two classes being Ornithodelphia and Didelphia. The Monodelphia are characterized by the fact that the female passage or vagina is single. This sub-class includes all the Mammalia except monotremes and marsupials. But de Blainville's names are now usually replaced by the terms Prototheria, Metatheria, and Eutheria, proposed by Huxley.

Monomania, a popular expression often employed under the belief that there is a form of insanity in which the mind of the patient is absorbed by one morbid idea or impulse, and the person seems to be insane only in one direction. Dipsomania and kleptomania are regarded as two varieties of monomania.

Monometallism. See *Bimetallism*.

Monophysites, those who maintained that there was but one nature in the incarnate Christ, that is, that the divine and human natures were so united as to form but one nature, yet without any change, confusion, or

mixture of the two natures. They were condemned as heretics by the Council of Chalcedon in 451. The Monophysites split into several sects. In Egypt, Syria, and Mesopotamia the congregations remained the strongest, had patriarchs at Alexandria and Antioch, existing, without interruption, by the side of the imperial orthodox patriarchs, and after Jacob Baradaeus had, about 570, established their religious Constitution, formed the independent Churches of the Jacobites and Armenians, which have maintained themselves ever since. The Coptic Christians of Egypt and the Abyssinian Church are also Monophysites in doctrine.

Monop'oli (ancient *Minopollis*), an Adriatic seaport of Apulia, South Italy, in the province of Bari. The castle dates from 1552, when it was founded by Charles V. There is also a cathedral. Oils and wines are exported; there are manufactures of woollen and cotton goods. Pop. about 24,000.

Monop'oly is an exclusive right, conferred by authority on one or more persons, to carry on some branch of trade or manufacture. The entire trade and industry of the Middle Ages was characterized by attempts to erect and maintain monopolies, as evidenced by the trade-guilds and such associations as the Hanseatic League. The discovery of the New World only provided a fresh sphere for the same system, for not only did every Government endeavour to monopolize the trade of its colonies, but in nearly every case the new countries were opened up by privileged 'adventurers' and jealous monopoly companies. The granting of monopolies has at all times been opposed to the spirit of English common law. Notwithstanding the reluctance of the Crown to surrender what was considered one of its most valuable prerogatives, the Statute of Monopolies (21 James I cap. iii) was passed in 1623, abolishing all licences, monopolies, &c., with some exceptions. This Act is (with amendments) still in force; and its excepting clauses are the basis of the present laws relating to patents and copyrights. Both in Great Britain and other countries there are various Government monopolies maintained on certain grounds of public policy. Examples: the postal and telegraph service, and the tobacco monopoly in France. There are also numerous quasi-monopolies, such as those enjoyed by railway, water, and gas companies, and similar semi-public organizations. See *Trusts*.

Mon'oth'eism, the belief in, and worship of, a single, personal God; opposed to polytheism and distinct also from pantheism. It was at one time the received opinion that monotheism was the primeval intuitive form of religion, but most recent authorities now hold that it was every-

where posterior to polytheism, whence it was gradually evolved. *Henotheism* would form an intermediate step, this being the belief in one God as superior to others or as the particular deity of a family, tribe, or people, the existence of other deities being not denied, or indeed fully admitted. Some see this stage in the Jehovah of early Jewish belief. The three great modern monotheistic religions are Judaism, Christianity, and Mahomedanism. The Jewish prophets had a firm persuasion of one God, the Father and Judge of all; but they are continually upbraiding the people for lapsing into polytheism. After the Babylonish captivity the people became fixed in their belief. Christian monotheism is, of course, historically a development of Hebrew monotheism; and Mahomet probably borrowed the doctrine from the same source. Both Jew and Mahomedan regard the Trinitarian conception of the Deity as a deviation from the pure doctrine of monotheism. Cf. A. Lang, *The Making of Religion*.

Monoth'eistes, a sect of heretics who maintained that Christ had but *one will* (Gr. *monos*, single, *thelein*, to will). Their doctrine was the logical extension of the heresy of the Monophysites, who were all Monothelites. The sect rose into prominence in the seventh century, but the heresy gradually became extinct except in the Monophysite churches.

Monot're'mata. See *Lebidna*.

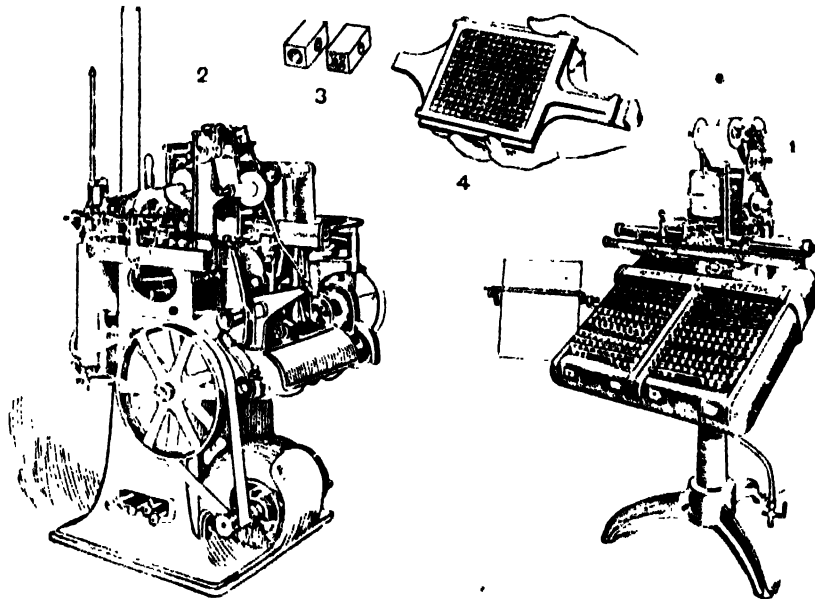
Monotype, a machine for setting up type. Each letter is cast and set as required through the intermediary of a roll of punctured paper. The roll of paper is punctured in a machine resembling a large typewriter, which is called the keyboard, and the roll of paper is then transferred to the casting-machine, where it controls, by means of compressed air, the position of an assemblage of letter-moulds known as a matrix case. The matrix is made to occupy a definite position for any given letter, so that the mould for the letter in question is exactly opposite a small jet through which molten type-metal is squirted. (See illustration on p. 440).

Monreale (mon-re-à'la), a city of Sicily, in the province of Palermo. It originally sprang up around the church and monastic establishment founded here in 1174 by the Norman prince William II. Monreale is the seat of an archbishop. The old city became a metropolitan cathedral of Sicily in 1182. Pop. about 25,000.

Monroe (mon-rō'), James, fifth President of the United States of America, was born in Westmoreland county, Virginia, Sept. 18, 1758, at New York in 1831. He was educated at William and Mary College, and from 1776 till 1778 served in the Revolutionary army. He then devoted himself to the study of law. In 1782 he

he was elected a member of the Virginia Assembly, and from 1783 till 1786 he represented Virginia in Congress. In 1788 as a member of the Convention of Virginia he strenuously opposed the ratification of the new Federal Constitution. In 1790 he was elected to the Senate of the United States, and from 1794 to 1796 he was Minister Plenipotentiary to France. From 1799 till 1802 he was Governor of Virginia, and in 1803 he returned as Envoy-extraordinary to France on a mission which resulted in the acquisition of Louisiana for 15,000,000 dollars.

dangerous to their peace and safety. At the same time the American continents were declared to be no longer subjects for colonization by any European power. The doctrine has several times been asserted, notably in the attitude of the United States towards Napoleon III during his Mexican undertaking, and in connection with the Panama Canal and the Venezuela-Guiana boundary question. It has all the force of a first principle in the United States. At the first Hague Conference in 1899 the delegates of the United States stated distinctly that the Mon-



Monotype

1, The Keyboard. 2, The Casting Machine. 3, Matrices. 4, The Matrix Case, containing 225 separate matrices.

In 1816 the Democratic Republican party elected him to the presidency of the United States. In 1820 he was re-elected, only one vote being cast against him. This he owed chiefly to his having procured the cession of Florida by Spain, and to the settlement of the vexed question of the extension of slavery by the Missouri compromise. Mexico and the emancipated states of South America were formally recognized by the American Government. During Monroe's second term the leading event in it was the promulgation of the 'Monroe doctrine'. The doctrine, a principle in international politics, corresponding in America to the balance of power in Europe, was formulated in President Monroe's message of 2nd Dec., 1823, in the statement that the United States would consider any attempt to extend the European political system to any portion of America as

dangerous to their peace and safety. At the same time the American continents were declared to be no longer subjects for colonization by any European power. The doctrine has several times been asserted, notably in the attitude of the United States towards Napoleon III during his Mexican undertaking, and in connection with the Panama Canal and the Venezuela-Guiana boundary question. It has all the force of a first principle in the United States. At the first Hague Conference in 1899 the delegates of the United States stated distinctly that the Mon-

roe Doctrine was the settled policy of their country. -- Cf. W. H. Taft, *The United States and Peace*.

Monro'via, the seaport-capital of the Republic of Liberia, founded in 1824, and named after President Monroe. Pop. 6000.

Mons (mons; Fl. *Bergen*), a town of Belgium, capital of the province of Hainault, on the Trouille. It was until 1862 one of the strongest fortresses of Europe, but the fortifications were then demolished and their site occupied by a fine boulevard. The principal buildings are the church of Ste Waudru, built between 1430 and 1589 and the town hall (founded 1458). Among manufactures are linen, woollen, and cotton fabrics, fire-arms, cutlery, and soap. Coal is extensively mined in the vicinity. In 804 Mons, which occupies the site of one of Caesar's forts, was made the capital of Hainault by Charle-

magne. It has figured much in history. The town was occupied by the Germans, and regained by Canadian troops on 11th Nov., 1918. See *European War*. Pop. 28,000.

Mon'soon, an alternating wind which blows for one-half of the year in one direction, and for the other half in the opposite direction, contrasting in this respect with a trade-wind, which blows in the same direction all the year round. **Monsoons**, like ordinary land and sea breezes, are caused by variations in the relative temperature of ocean and land. The relation between the mean daily temperature of land and sea depends partly on the latitude, and partly on the season of the year. At the equator the ocean mean is always the lower, but as the latitude becomes higher it approaches and ultimately surpasses the mean temperature of the land. The reversal of sign of relative temperature with change of latitude is very marked in winter, so that it may happen, as it does in Asia, that the ocean acts as the warm (and therefore low-pressure) region in winter, and as the cold (high-pressure) region in summer. Thus in winter the north-east monsoon blows over the China Sea, Cochin-China, and the Indian Ocean. In summer, on the other hand, the monsoon over the Indian Ocean blows strongly from the south-west, with heavy rainfall. Monsoons of slighter intensity occur in Australia, Spain, and the south-eastern part of the United States.

Monster, or **Monstrosity**, a term applied in anatomy and physiology to living beings which exhibit from birth onwards some important abnormal features in structure, or present notable deviations from the normal type of their kind. The science which investigates such abnormal forms is known as *teratology*. Monsters present very wide variations in the characters and degrees of the malformations, ranging from an almost imperceptible to an almost total deviation from the normal type. But there are definite types of monstrosities, distinguished by distinct anatomical characters, just as there are definite types of normal structure; and the former may be classified by considering the fetus or embryo. The anatomist may at once detect all fictitious cases of monstrosities by noting that they present characters perfectly incompatible with any known type of abnormal development. Tales of monsters occurring both in man and in beasts are met with in the writings of the older anatomists and naturalists; but such accounts, if not entirely destitute of truth, owe most of their interest to the liberal embellishment with which they have been recorded. Old writers have argued for the production of such ideal monsters by the intercourse of demons and women, of brutes and men; and witchcraft, magic, spell,

divine vengeance - and, more lately, the effect upon the mother's mind of fright, terror, dreams, &c. - have each and all been credited, but equally erroneously, with causing malformations and abnormalities in the yet unborn child or embryo. Teratology can explain most, if not all, malformations as results of interference with the normal development of the organism, and as caused by some physical or chemical disturbance. These so-called '*freaks of nature*' are in truth the results of morbid actions and operations in the living organism, as well defined, but not yet so well known, as are those of the healthy and normal body. Among the prominent or primary causes in the production of monstrosities in the human embryo are the following: Deficiencies or deformations in the reproductive organs and materials of the father or mother, or of both parents; diseases or malpositions of the placenta or after-birth, or of the fetal membranes; retardation in the development of the fetus itself, arising from pressure, injuries, or actual disease either originating from the germ itself or communicated from the mother; and the presence of actual or potential disease in either or both parents. Injuries to the mother may also to some extent affect the embryo, though most authorities are doubtful on the point. Malformations and monstrosities are frequently met with in the lower animals, and particularly in those which are domesticated by man. In the plant world monstrosities also occur.

Mon'strance, or **Remonstrance**, called also *ostensorium* or *expositorium*, is the sacred vessel in which, in the Roman Catholic Church, the host is shown to the people at benedictions, processions, and other solemnities. Its use probably dates from the establishment of the festival of Corpus Christi in 1264 by Pope Urban IV. The earliest monstrances known date from the fourteenth century, and are made in the form of a Gothic tower. The most common form now consists of a chalice-footed stand of some precious metal, and a circular repository, usually a transparent pyx, surrounded by sun-like rays. In the Greek Church the monstrance is shaped like a cross.

Montagnards (mon-tan-yar), or *La Montagne*, 'the Mountain', a popular name in French history, given to the extreme democratic party in the Convention, because they occupied the higher rows of benches in a hall where it met. The chiefs of 'the Mountain' were Danton, Marat, and Robespierre; the men who introduced the Reign of Terror. The Mountain rose to the height of its power in June, 1793, and for more than a year it was sufficiently formidable to smother all opposition. Soon after the fall of Robespierre (27th July, 1794) the names of 'Montagnard' and 'Jacobin'

tagne gradually disappeared from party nomenclature.

Montagu, Lady Mary Wortley, English writer, was born in 1689, and died in 1762. She was the eldest daughter of Evelyn Pierrepont, afterwards Duke of Kingston. In 1712 she made a runaway match with Edward Wortley Montagu, a wealthy Whig scholar, who had quarrelled with her father. In 1716 Montagu was appointed Ambassador to the Porte, and Lady Mary accompanied him to Constantinople, where they remained from Jan., 1717, to May, 1718. It was during this period that Lady Mary's famous *Turkish Letters* were written. Lady Mary remained abroad, living chiefly in Italy, from 1739 until her husband's death in 1761; but soon after her return to England she herself died of cancer in the breast. Her letters are marked by great vivacity and graphic power, together with keen observation and independent judgment.— Cf. G. Paston, *Lady Mary Wortley Montagu and her Times*.

Montaigne (mon-tan'; Fr. pron. mon-tayny), Michel Eyquem de, French essayist, was born in 1533 at the castle of Montaigne, in Périgord, died in 1592. He learned Latin conversationally before he could speak French, and Greek was also an early acquisition. At the age of six he became a pupil at the Collège de Guenne at Bordeaux, and at thirteen he began to study law. Little is known of his youth and early manhood. In 1571 he retired to his ancestral château, and devoted himself to peaceful study and meditation. In 1580 he published the first two books of his *Essays*, and immediately afterwards set out on a journey through Germany, Switzerland, and Italy to restore his health, which had been shattered by the attacks of a hereditary disease. In 1582 and 1584 he was chosen Mayor of Bordeaux. In 1588 he republished his *Essays*, with the addition of a third book. After a last visit to Paris (in the course of which he was thrown into the Bastille for a short time by the Leaguers) Montaigne seems to have dwelt quietly in his château. Montaigne's *Essays* has at all times been one of the most popular books in the French language. They embrace an extraordinary variety of topics, which are touched upon in a lively, entertaining manner, with all the keenness of strong native good sense, carefulness of system or regularity. Montaigne's notes and quotations from the ancients are interspersed with his own remarks and opinions, and his own stories of himself in a pleasant strain of self-praise, and with an occasional licence, to which even moralists can with some difficulty reconcile themselves. His *Voyages*, a diary of his journeys in 1580-2, the MS. of which was discovered 180 years after his death, was published in 1774. There are two English transla-

tions of the *Essays*, one by Charles Cotton, and an earlier one by John Florio.—**BIBLIOGRAPHY:** W. L. Collins, *Montaigne*; E. Dowden, *Michel de Montaigne*; E. Sichel, *Michel de Montaigne*; V. Giraud, *Les Époques de la pensée de Montaigne*.

Montalembert (mon - tã - lã - bãr), Charles Forbes René, Comte de, French publicist, politician, historian, and theologian, born in London, 1810, died at Paris 1870. Of his very numerous writings the chief is *Les Moines d'occident depuis St. Benoît jusqu'à St. Bernard* (English translation 1861-8). Others are *Vie de Ste Élisabeth de Hongrie* (1836) and *L'Avenir politique d'Angleterre* (1855).

Montana, a state in the mountain division of the United States, bounded by Canada in the north, and traversed by the Rocky Mountains in the west. The Missouri has its source in and traverses Montana; the Milk and Yellowstone Rivers, alluents of the Missouri, are also important. In sheep-farming and wool-production Montana holds premier place among the United States, the clip in 1919 yielding 17,750,000 lb. of wool. Agriculture, dependent in a degree upon efficient irrigation, produces wheat (19,850,000 bushels in 1920), oats, barley, flax-seed, potatoes, hay, and some silage. Stock-raising is very important, and some fruit is grown. In 1920 public lands, unappropriated and unreserved, amounting to 5,973,741 acres, were available for grant in 160-acre lots to prospective farmer-settlers. There is an extensive lumbering industry, the afforested area covering (1917) 16,025,463 acres. Mineral resources are large and almost untapped. Coal, copper, gold, silver, lead, tungsten, zinc, corundum, grindstones, and sapphires being found. Manufactures are principally confined to copper, i.e. smelting and refining. Railway mileage was 4953 in 1917, and in 1919 there was an additional 798 miles of electric track. The inhabitants are of mixed origin, and include large numbers of Canadians, Irish, and Germans. An Indian Reserve of 5536 sq. miles (1919) had a pop. of 12,138. Helena (pop. 1920, 12,097) is the state capital, other towns being Butte (41,611), Great Falls (24,121), Billings (15,100), Anaconda (11,608), and Missoula (12,608). The University of Montana comprises a College of Agriculture and Mechanical Arts at Bozeman, a School of Mines at Butte, a Normal School at Dillon, and the State University (founded 1895) at Missoula. Area, 147,182 sq. miles (796 water);—pop. (1920), 548,889.

Montana was admitted to the Union on 22nd Feb., 1889. The present Government comprises a Governor, Senate (51 members, elected for four years, one-half seeking biennial re-election), and House of Representatives (104 members, sitting for two years). Two Senators

and two Representatives are sent to Congress. For local government the state is divided into 51 counties and 20 judicial districts.

Montanus, the founder of a Christian sect, appeared about the middle of the second century in Phrygia as a few Christian prophet, advocating an ascetic code of morals and behaviour, fasting, celibacy, and willing submission to martyrdom. He sought to establish a community of all true believers at Pepusa, in Phrygia, there to await the second Advent. The Montanists were forced to withdraw from the Catholic Church and form themselves into a separate sect in Phrygia about 180. In North Africa they flourished for some time, but by the fourth century they seem everywhere to have disappeared.

Montargis (mon-târ-zhe), a town of France, department of Loiret, on the Loing. It is the junction of the three canals of the Loing, Orléans, and Briare, and is a railway junction with an important trade. Pop. 13,000.

Montauban (mon-tô-ban), chief town of the department of Tarn-et-Garonne, France; on the Tarn. Silk, wool, &c., are manufactured. Montauban was a stronghold of the Huguenots, and is still a Protestant centre. Pop. 30,000. *Montauban* is also the name of a village in France, department of Somme, which became prominent during the European War (battles of the Somme, and battle of Bapaume).

Montbéliard (mon-bê-li-âr), a town of France, in the department of Doubs. It is situated at the confluence of the Allaine and Lousine, and is on the Rhône-Rhône Canal. Pop. 10,000.

Mont Blanc (that is 'White Mountain'), the loftiest mountain of Europe, belonging to the Pennine chain of the Alps, and rising 15,781 feet above the sea-level, is situated on the frontiers of France and Italy, and near that of Switzerland. The main portion of the mountain and the highest summit are in France (Haute-Savoie). The huge mountain mass (30 miles long by 10 miles wide) is almost entirely granitic. It has numerous peaks, some rounded, some sharp (aiguilles). On the south-east its face is steep; on the north-west lateral chains are sent off, among which about thirty glaciers are counted. The chief are the glaciers Des Bossons, Bois, Argentière, and Mer de Glace. The summit was first reached in June, 1786, by the guide Jacques Balmat. The ice-summit of Mont Blanc slipped from its place in Nov., 1920.

Montdidier, a town of France, department of Somme, 23 miles from Compiègne. It was occupied by the Prussians in 1870, and became prominent during the European War (battles of the Somme). Captured by the Germans in March, 1918, it was retaken by the French on 10th Aug.

Monte Carlo, a Riviera town in the Principality of Monaco, adjoining the town of that name. It stands on the Bay of Monaco, and is much frequented on account of its magnificent casino (built 1878), in which trente-et-quarante, roulette, and other games are played. Pop. about 9000.

Monte Casino (or *Cassino*), an Italian monastery near Cassino, in the north of Campania, Italy. It was founded in A.D. 520 by St. Benedict on the site of an ancient temple of Apollo, to which Dante alludes, and was the first monastery of the Benedictine Order. It became renowned for its privileges and wealth, and its library rich in MSS. As a monastery it was dissolved in 1860, but it continues to exist in the form of an educational establishment.

Monte Cristo (the ancient *Ogliastro*), a small island 6 miles in circumference belonging to Italy, 25 miles S. of Elba, the seat of a penal colony. It has been immortalized in the masterpiece of Dumas père, to which he gave the title *Le Comte de Monte-Cristo*.

Montecuculi, or, more correctly, **Montecucoli**, Raimondo, Prince of the Empire, and Duke of Melli, military commander, born 1608, died 1680. In 1604 he gained a great victory over the Turks after having driven them out of Transylvania. In 1673 he was placed at the head of the imperial troops, and checked the progress of Louis XIV by the capture of Bonn, and by forming a junction with the Prince of Orange in spite of Turenne and Condé. Montecuculi's subsequent advance into Alsace was repulsed by the Prince of Condé. His last military exploit was the siege of Philipshurg.

Montefiore (mon-te-fi-ô-râ), Sir Moses, Jewish philanthropist, was born 1784, died 1885. His benevolence to Jews throughout the world was unbounded; and he visited Palestine seven times, the last when in his ninety-second year.

Monte Grappa, The Battles of, were fought during the European War (q.v.) between the Austro-Germans and the Italians in 1917 and 1918.

Montélimar (mon-tâ-li-mâr; the ancient *Acustum*), a town of France, department of Drôme, formerly a stronghold of the Huguenots, and capital of Val de Rhône in mediaeval times. It has manufactures of silk, iron, &c. Pop. 14,000.

Montenegro (native *Crnogora*, Turk. *Karadagh*, 'Black Mountain'), formerly an independent kingdom in Europe, now a province of the Kingdom of Serbia. The surface is everywhere being covered by an extension of the Balkan Alps, rising to the height of 8000 ft. The principal river is the Moratcha. Forests of beech, pine, chestnuts, and other valuable timber cover many of the mountain sides. Maize and some tobacco, barley, &c. are

produced, and cattle are reared in great numbers. The almond, vine, and pomegranate are cultivated in the more sheltered valleys. Peasant ownership of land is generally in force. The chief occupations of the Montenegrins are agriculture and fishing. The chief towns (in reality little more than villages) are Cetinje and Jakova. The Montenegrins are pure Serbs and speak a Serbian dialect. In religion they are of the Greek Orthodox Church. Montenegro has a population of about 270,000.

Montenegro, first appearing as a principality under the name of Zeta in the fourteenth century, was subject to the great Serbian kingdom till 1389, when the Serbians were defeated at Kossovo, and the Montenegrins founded a prince-bishopric in the mountains under the protection of a Russian alliance. The dignity was inherited through brothers and nephews, and after 1697 became hereditary in the family of Petrovitch Njegos. The history of Montenegro for many years is a record of deadly struggles with the Turks, and of a slowly growing civilization among its inhabitants. In 1852 Danilo II became vladika (prince-bishop), but in 1855 he married, threw off his ecclesiastical character, assuming the title of Hospodar or prince, and transformed his land into a secular principality, the independence of which was soon recognized by Russia. Danilo was assassinated in 1860, and Nicholas I Petrovitch became Hospodar. In 1861-2 he engaged in a not altogether successful war against Turkey; but in 1876 he joined Serbia and in 1877-8 Russia against his hereditary foe, with the result that 1900 sq. miles were added to his territory by the Treaty of Berlin. He assumed the rank of king in 1910. During the European War Montenegro was on the side of the Allies. In Nov., 1918, King Nicholas was deposed and Montenegro was united with Yugoslavia. BIBLIOGRAPHY: F. S. Stephenson, *A History of Montenegro*; C. Stoyanovitch, *The Kingdom of the Serbians, Croats, and Slovenes*.

Monterey, or Monterrey, a city and capital of the state of Nuevo Leon, Mexico. It lies at an altitude of 1925 feet in a spur of the Sierra Madre, about 100 miles from the Texan frontier, and is a railway junction on the direct lines from Tampico and the United States. It is the seat of a bishop. The industries are varied. Monterey was founded in 1565 as Leon, the name being changed in 1590 when it became a city. There is a railway station. Pop. about 80,000.

Montespan (mon-tess-pän), Françoise Atthes, Marquise de, mistress of Louis XIV, born in 1641, died in 1707. She was the second daughter of the duke de Mortemart, and was in 1663 married to the Marquis de Montespan. As the most fascinating beauty she added a bewitching liveliness and wit, and a highly cultivated

mind. Soon after her appearance at court she attracted the king's attention, and from 1668 till 1674 she shared his favour with Louise de la Vallière. The latter, however, withdrew in 1674; M. de Montespan had already been ordered to retire to his estate. Mme de Montespan bore eight children to the king, four of whom died in infancy. The others were entrusted to the care of 'the widow Scarron' (later Mme de Maintenon). The influence of the favourite mistress was often exercised in public affairs, and her empire over the king continued until about 1679, when a growing attachment to Mme de Maintenon finally estranged his affections from Mme de Montespan. In 1691 Mme de Montespan quitted the court, and devoted her last years to religious exercises and penitence.

Montesquieu (mon-tess-kyeu), Charles Louis de Secondat, Baron de la Brède et de, born 1689 at the château of La Brède, near Bordeaux, died at Paris 1755. He studied law; in 1714 became a counsellor of the Parliament of Bordeaux; and in 1716, on the death of his uncle, parliamentary president and Baron de Montesquieu. The *Lettres Persanes*, the first of the three great works on which his fame principally rests, appeared in 1721. Purporting to consist of the correspondence of two Persians travelling in France, this book is a lively satire upon the manners and customs, and the political and ecclesiastical institutions of the author's age and country. Other works of less importance followed; and in 1728 Montesquieu was admitted to the French Academy. He gave up his president's office in 1726, and then visited Germany, Hungary, Italy, Holland, and England. In England he stayed for eighteen months, and imbibed a deep admiration for its social and political institutions. He returned to France in 1731, and in 1734 he published his *Considérations sur les causes de la grandeur et la décadence des Romains*. In 1748 *L'Esprit des Lois*, the result of twenty years of labour, was published, and at once placed its author among the greatest writers of his country. The scope of the work is perhaps best indicated by the subtitle of the original edition, which describes it as a treatise on the relation which ought to exist between the laws and the Constitution, manners, climate, religion, commerce, &c., of each country. Among his lesser works are: *Dialogue de Sylla et d'Eucrate*, *Le Voyage de Paphos*, *Essai sur le goût* (unfinished), *Arsace et Iménie* (probably a work of his youth) and *Lettres familières*.—BIBLIOGRAPHY: Sir C. P. Ilbert, *Montesquieu*; L. Vian, *Histoire de Montesquieu: sa vie et ses œuvres*; Sorel, *Montesquieu*.

Montessori, Maria, Italian educationist, was born at Rome in 1870. She took the degree of doctor of medicine in 1894, and from 1898 to 1900 was director of a school for mentally defective

children. She lectured in the United States, in 1913, and in England in 1919. Several of her works on education have been translated into English. For *The Montessori Method*, see *Education*.

Montevideo, a maritime department, forming the most densely peopled area of Uruguay, at the mouth of the Rio de la Plata. It is a wine-growing district, with a hilly surface suited for stock-raising. Area, 236 sq. miles; pop. 387,000 (or 1,480.4 people per square mile).

Montevideo, a seaport-city of Uruguay, the state capital and capital of the department of Montevideo, on the Bay of Montevideo and the Rio de la Plata, of which the bay forms an arm. Montevideo is the principal seaport of Uruguay, and is the terminus of the Central and North-Eastern Railway lines. It is laid out on modern transatlantic lines, and claims to be the finest-built city in America. There are two race-courses and a bull-ring near the city, which abounds in clubs and hotels. As the seat of a bishop and two bishops suffragan there is a fine cathedral (completed 1905). The climate is fairly healthy, but it is very hot in summer. As a port Montevideo's enormous harbour offers insecure protection to shipping from gales and storms, but nevertheless a great transit trade is carried on in live stock, canned meat, and meat products in general. The town was founded in 1706, and became capital of Uruguay in 1828. Pop. (1920), 361,950.

Montezuma, Aztec emperor of Mexico when Cortez invaded the country in 1519. Influenced by an ancient prophecy, he at first welcomed the Spaniards; but when he discovered that they were no supernatural beings, he secretly took measures for their destruction. Cortez on learning this seized Montezuma, and compelled him to recognize the supremacy of Spain. The Aztecs immediately rose in revolt, and refused to be quieted by the appearance of Montezuma. While urging them to submission, he was struck on the temple with a stone and fell to the ground. Cut to the heart by his humiliation, he refused all nourishment, tore off his bandages, and soon after expired.

Montfort, Simon de, Earl of Leicester, English statesman and soldier, was born in France between 1195 and 1200, died 1265. The youngest son of Simon de Montfort, Earl of Leicester, the 'scurge of the Albigenes', he won the favour of Henry III, and married Eleanor, Countess-Dowager of Pembroke, and sister of the king. After spending some years in France, on his return to England in 1254 he took a prominent part in the disputes between the Crown and the barons. He was conspicuous among those who extorted the *Provisions of Oxford* from the king in the 'Mad Parliament'

in 1258; and he was the leader of the barons in the so-called 'Barons' War' that followed. In 1264 he agreed to submit the question of the king's right to repudiate the *Provisions* to Louis XI of France; but when the latter, by the Mise of Amiens, decided in favour of Henry, De Montfort refused to be bound by the decision. Both sides took up arms, and at the battle of Lewes (14th May, 1264) the king was defeated and taken prisoner. The Mise of Lewes, to which Henry III agreed, contained the outlines of a new Constitution, in which the principle of representative government was recognized; but this principle was carried a step further in the famous Parliament of De Montfort, which was summoned to meet at Westminster on 20th Jan., 1265. The distinctive feature of the new Parliament was the fact that, for the first time, writs were issued for the election of members from cities and boroughs as well as from the counties. For this reason Simon de Montfort is sometimes spoken of as the 'founder of the House of Commons'; though the regular representation of cities and boroughs in Parliament did not really begin till 1295. The king accepted the Constitution on 14th Feb., 1265; but Prince Edward and the Mortimers raised the standard of revolt. At the battle of Evesham De Montfort was defeated and slain. His memory was long revered by the people as that of a martyr for popular liberty.

Montgolfier, Joseph Marie (1740-1810) and Jacques Etienne (1745-99), joint-inventors of the balloon, were born at Vidoulon-lez-Annonay, in the department of Ardèche, in France. Their first balloon, inflated with rarefied atmospheric air, ascended from Annonay in 1782, and the invention soon brought them fame and honour. Joseph was also the inventor of the water-ram.

Montgomery, Alexander, a Scottish poet who flourished during the latter half of the sixteenth century, was born at Hazelhead Castle, in Ayrshire, died probably between 1605 and 1610. His principal poem, the allegory of the *Cherrie and the Slae*, was first published in 1597. Many of his sonnets and miscellaneous pieces were written much earlier and circulated in manuscript.

Montgomery, James, minor poet and journalist, was born in 1771, died in 1854. *Prison Amusements*, his first volume of verse, came out in 1797. In 1800 appeared his *Wanderings in Switzerland*, the first effort of his which gained the approbation of the public. It was followed in 1809 by *The West Indian*; in 1813 by *The World before the Flood*; in 1819 by *Greenland*, a missionary poem; and in 1827 by *The Pelican Island*, perhaps his best work. He also wrote a number of hymns and other small pieces, which were published along with his longer poems.

Montgomery, or **Montgomeryshire**, an inland county of North Wales, has an area of 510,110 acres, consisting mostly of wild, rugged, and sterile mountains, varying from 1000 to 2000 feet in height. It contains, however, some fine and fertile valleys, the most extensive and fruitful of which is that of the Severn, the principal river. The county is almost entirely occupied by the slate-rocks which overspread so large a portion of Wales. Some lead is obtained, as well as slate and limestone. Agriculture is carried on chiefly in the narrow valleys, and on the east side of the county, bordering on Salop, where oats with some wheat and fruit are produced. In the hilly districts sheep-farming is much practised; cattle and small and hardy ponies, commonly called *merlins*, are reared. Flannels are manufactured to some extent. Montgomery is the county town, but the largest town is Welshpool. Pop. (1921), 51,317.

Montgomery, county town of Montgomeryshire, a mere village, with a fine old church and ruined castle, belongs to the Montgomery district of boroughs, which includes also Newton, Welshpool, &c. Pop. (1921), 951.

Montgomery, a city of Alabama, United States, county seat of Montgomery county, on the Alabama River, and on the Louisville and Nashville Railway. The Alabama is navigable for ocean-going steamers as far as Montgomery, which is in direct communication with Europe, Panama, and New York. It is one of the great centres of the United States cotton trade, and has extensive manufactures. Montgomery was settled in 1814, and superseded Tuscaloosa as state capital in 1847. It was the administrative centre of the Confederacy between Feb. and May, 1861, and was taken by the Federals on 12th April, 1865. Pop. (1920), 43,464.

Month, a period of time derived from the motion of the moon; generally one of the 12 parts of the calendar year. The calendar months have from 28 to 31 days each, February having 28, April, June, September, and November 30, the rest 31. Month originally meant the time of one revolution of the moon, but as that may be determined in reference to several celestial objects there are several lunar periods known by distinctive names. Thus the *anomalistic month* is a revolution of the moon from perigee to perigee, average 29 days 13 hours 19 minutes; the *sidereal month*, the interval between two successive conjunctions of the moon with the same fixed star, average 27 days 7 hours 43 minutes; the *synodical*, or *proper lunar month*, the time that elapses between new moon and new moon, average 29 days 12 hours 44 minutes. The *solar month* is the twelfth part of one solar year, or 30 days 10 hours 29 minutes.

Montmédy, a town of France, department

of Meuse, on the Chiers. It was occupied by the Prussians in 1870, and by the Germans during the European War. It was retaken by the Allies in Nov., 1918. Pop. 3000.

Montmorency (*mon-morān-si*), the name of a noble family of France and the Netherlands, derived from the village of Montmorency, near Paris. One of its most distinguished members was Anne de Montmorency, first duc de Montmorency, Constable of France, and a distinguished general, born in 1492. He distinguished himself at the battle of Marignano in 1515, and for his valour at Bicocca in 1522 was made marshal. He was taken prisoner along with Francis I at the battle of Pavia in 1525, but was soon after ransomed. In 1536 he defeated Charles V. Francis I conferred on him the dignity of Constable in 1538. In 1551 he was made a duke. In 1557 he lost the battle of St. Quentin against Philip II of Spain, and was taken prisoner, but he regained his freedom by the Peace of Cateau-Cambrésis in 1559. Under Charles IX he joined the duc de Guise and Marshal St. André in forming the famous triumvirate against Condé and the Huguenots. At the battle of Dreux, in 1562, Montmorency was made prisoner by the Huguenots; on the renewal of the Civil War he gained a decisive victory over them at St. Denis, 10th Nov., 1567, though the following day he died of his wounds.

Montpellier, a town of France, capital of the department of Hérault, a railway junction and the head-quarters of an army corps. The university was first founded in 1289, and is associated with such names as Petrarch (a student) and Casaubon, who was a professor; the medical school was founded by Moorish physicians. The botanical garden, founded in 1503 by Henri IV, is the oldest in France. There are many manufactures, and a trade in corn, wine, and silk is maintained through the port of Cette (Gulf of Lions). Montpellier had a charter in 1141 and became a Huguenot centre, being taken by Louis XIII in 1622. The Edict of Montpellier (20th Oct., 1622) confirmed the Edict of Nantes. The town was capital of pre-Revolutionary Languedoc. Pop. 80,230.

Montreal, the largest city and the commercial and financial metropolis of Canada, on the Island of Montreal, province of Quebec, and at the head of ocean navigation on the St. Lawrence River, 1000 miles from the Atlantic. It has a complete system of river, canal, and railway connection with the interior, and although only open for about seven months each year (usually between 24th April and 1st Dec.), Montreal is in importance the second port of the two Americas and seventh of the world. The harbour includes both sides of the St. Lawrence River, and extends for a distance of about 17 miles

between Verdun and Bout de L'Île, vessels entering from the Great Lakes at the east end of the Lachine Canal, and those from the Atlantic using the dredged ship channel above Quebec. There is berthage for twenty ocean-going vessels of 500 feet in length, drawing 28 to 30 feet, and a total wharfage of about 8½ miles. The floating dock has a length of 500 feet with a width of 100 feet, a docking draught of 30 feet, and a lifting capacity of 25,000 tons. There are stationary and floating grain-elevators, by which eleven ships may be loaded simultaneously at the rate of 15,000 bushels per hour. Montreal is the head-quarters of the Canadian Pacific and dissolved Grand Trunk Railways, the former having workshops in the vicinity; the city is served by the Canadian Pacific, Canadian National (with Northern and Grand Trunk lines), Rutland, and the Delaware, Hudson, and Central Vermont Railways. Hydro-electric power is derived from the Shawinggan Falls and Lachine Rapids, and from rapids at Chambly. Among buildings are the McGill and Laval Universities, and a museum (Château de Ramenay) situated in the residence of the former French Governors. There are Anglican and Roman Catholic cathedrals. Montreal shows a marked mixture of races and interests, and although the better classes are largely English, a considerable proportion of the inhabitants are French and Irish Roman Catholics. Industries include boots and shoes, clothing, sugar-refining, flour-milling, cement, tobacco, rubber, iron and steel, machinery, tools, silks, cottons, woollens, paints, furniture, carriages, electric goods, and confectionery.

Montreal stretches back to the wooded slopes of Mont Royal (Mount Royal), from which the city derives its name. It originated on the site of the old Indian town of Hochelaga as a stockaded enclosure, seldom free from attack by the Iroquois, and was a centre of the fur trade. Pop. (1922), about 800,000.

Montreux, a parish and series of villages in the canton of Vaud, and on the north-east shore of the Lake of Geneva (Lac Léman). Montreux is a tourist-resort. Pop. (estimated), 17,000.

Montrose, James Graham, Marquess of, son of the fourth Earl of Montrose, was born at Montrose in 1612, died in 1650. He studied at St. Andrews, and afterwards made a prolonged stay on the Continent. In 1637 Montrose joined the Covenanters in their resistance to episcopacy, and was sent to crush opposition to the popular cause which arose around Aberdeen. In 1639 he was one of the leaders who were appointed to confer with Charles I., after which he went over to the Royalist side, was created a marquess, and made commander of the royal forces in Scotland.

With an army partly composed of Irish and Highlanders he gained in rapid succession the battles of Tippermuir and Bridge of Dee (1644), Inverlochy, Auldearn, Alford, and Kiltyth (1645). Deserted by his Highlanders, however, he was defeated at Philiphaugh by Leslie, and fled to Norway in 1646. In March, 1650, he returned, landing in Orkney with a small body of followers. He failed, however, in raising an army, and a month later was surprised and captured in Ross-shire, and was conveyed to Edinburgh, where he was hanged and quartered. - Cf. John Buchan, *The Marquis of Montrose*.

Montrose, a seaport-town of Forfarshire, Scotland, at the mouth of the South Esk, which widens out into a shallow expanse behind the town, known as Montrose Basin; served by the North British and the Caledonian Railways. The river is crossed by a suspension-bridge, and by a railway bridge. Between the town and the sea are extensive 'links'. Montrose is a well-built and fairly prosperous provincial town, with the usual public buildings and institutions, including two public libraries and one of the largest parish churches in Scotland. The principal manufacturing industry is flax-spinning. Ship-building, fish-curing, &c., are also carried on, and there are extensive sawmills. The foreign trade, which is largely in timber, flax, &c., is chiefly with the Baltic and Canada. Montrose is also the centre of a fishery district. It is one of the Montrose district of burghs, which includes Arbroath, Brechin, Forfar, and Bervie. Pop. 10,970.

Montserrat, an island and one of five dependencies of the Leeward group, British West Indies. It has been described as 'a heap of craters smothered in verdure', and it is fairly mountainous, rising in the Soufrière Peak to over 3000 feet, its hills and even its mountains being covered with forests. The island produces lime-juice, cotton, sugar, cotton-seed, cattle, and papaya (see *Papaya*.) About 2000 acres are laid down in lime trees and 2700 in cotton. Citrate of lime is manufactured. Plymouth (pop. 1500) is the capital. The Government consists of a nominated Executive and Legislative Councils.

Monza (ancient Mediolan), a city of Milan, Italy, on the Lambro, and connected by rail and tram with Milan. The cathedral was founded in A.D. 595 by Queen Theodolinda, and contains the iron crown of Lombardy, with which Charlemagne (774) and Napoleon (1805) were crowned. The present building dates from the fourteenth century. Monza was the capital of ancient Lombardy. Pop. 53,200.

Moody, Dwight Lyman, American evangelist, born in 1837, died in 1890. He began his religious and missionary career in 1855 at Boston, where he was a shop-assistant, and in 1856 he

continued it at Chicago, where his influence became wide-spread. In 1873, in company with I. D. Sankey, he came to Great Britain, and the successful series of meetings held during the visit made the pair at once famous. Subsequent visits were made in 1881, 1883, and 1899, but the bulk of his work was done in the United States.

Moon, The, one of the secondary planets and the satellite of the earth, revolves round the latter in an elliptic orbit, in one sidereal month (see *Month*), at a mean distance of 238,840 miles, her greatest and least distances being 252,972 and 221,614 miles. Her mean diameter is 2159 miles. Her surface is about $\frac{1}{4}$ (14,000,000 sq. miles) of that of the earth; her volume $\frac{1}{49}$; her mass about $\frac{1}{81}$; and her mean density a little more than $\frac{1}{5}$. A mass weighing 1 lb. on the earth's surface would weigh about 2.64 oz. on the moon's surface. For every revolution in her orbit, the moon rotates once on her axis, so that the same portion of her surface is constantly turned towards the earth; but in virtue of an apparent oscillatory motion, known as libration (q.v.), about $\frac{1}{2}$ of her surface is presented at one time or another to terrestrial observers. If the moon's orbit were in the plane of the ecliptic, solar and lunar eclipses would occur monthly. Her orbit is, however, inclined $5^{\circ} 8' 48''$ to the ecliptic, so that her meridian altitude has a range of 57° , and she occults in course of time every star within $5^{\circ} 24' 30''$ of the ecliptic. An eclipse of the moon occurs when she passes into the earth's shadow; when she passes exactly between the earth and sun there is an eclipse of the sun. (See *Eclipse*.) The changes in the appearance of the moon, described by the words waxing and waning, are known as *phases*. The four chief phases, occurring at intervals of 90° in the lunar orbit, are New Moon, when she is between the earth and sun (i.e. in conjunction with the sun), and so turns an unilluminated side to the earth; First Quarter, when one-half of her illuminated disc (i.e. one-quarter of the entire lunar surface) is visible; Full Moon, when her whole illuminated disc is presented to the earth; and Last Quarter, when once more only half of her disc is visibly illuminated. Between new moon and full moon the moon is said to *wax*; on the rest of her course she *wanes*. When more than a semicircle is visible, she is said to be *gibbous*; when less than a semicircle, to be in *crescent* phase.

On the visible portion of the lunar surface

there is either no atmosphere or an exceedingly rare one, and it was long the general belief that organic life was impossible. Some astronomers, however, believe that there are evidences of traces of atmosphere and moisture, and that a low form of vegetation may exist. As each portion is alternately in sunlight and in shade for a fortnight at a time, and any atmosphere is of excessive tenuity, it is conjectured that the lunar extremes of heat and cold far exceed the greatest terrestrial extremes. The surface of the moon is mainly occupied by mountains, most of which are named after eminent scientific men. They are sometimes detached as precipitous peaks, more frequently they form vast continuous ranges, but the most prevalent form is that of crater-mountains, many 8 to 10 miles in diameter, and giving evident traces of volcanic action. Certain crater-like formations, which have still greater diameters, ranging to 60 or even 100 miles, are generally spoken of as 'walled plains'. Larger still are the 'grey plains', which were at one time taken for seas, before the absence of water from the lunar surface was demonstrated. They are thought by some to be the floors of former seas. Some of the mountains have been estimated to be over 24,000 feet in height, from observation of their shadows. Very peculiar ridges of comparatively small elevation extend for great distances, connecting different ranges or craters. The so-called 'rilles' or 'clefts' are huge straight furrows of great length (18 to 90 miles), which, it has been suggested, were produced by fracture of a shrinking surface. There are also valleys of various kinds, and 'faults', or closed cracks, sometimes of considerable length. In reading descriptions of the visible peculiarities of the moon, it should be remembered that the highest telescopic power applied to that planet is only equivalent to bringing it within about 40 miles of the naked eye.

The attraction of the sun for the earth and the moon tends to diminish in effect their mutual action, and produce what is called the *moon's variation*, which, on the whole, is such that in each lunation the moon's velocity is greatest when she is in syzygy, that is, at new or full, and least when nearly in quadrature, when the line from the earth to the moon is at right angles to the line from the earth to the sun. **BIBLIOGRAPHY:** *Treatises on the Moon* by Nasmyth and Carpenter, Neison, F. W. A. Pickering, Webb.

